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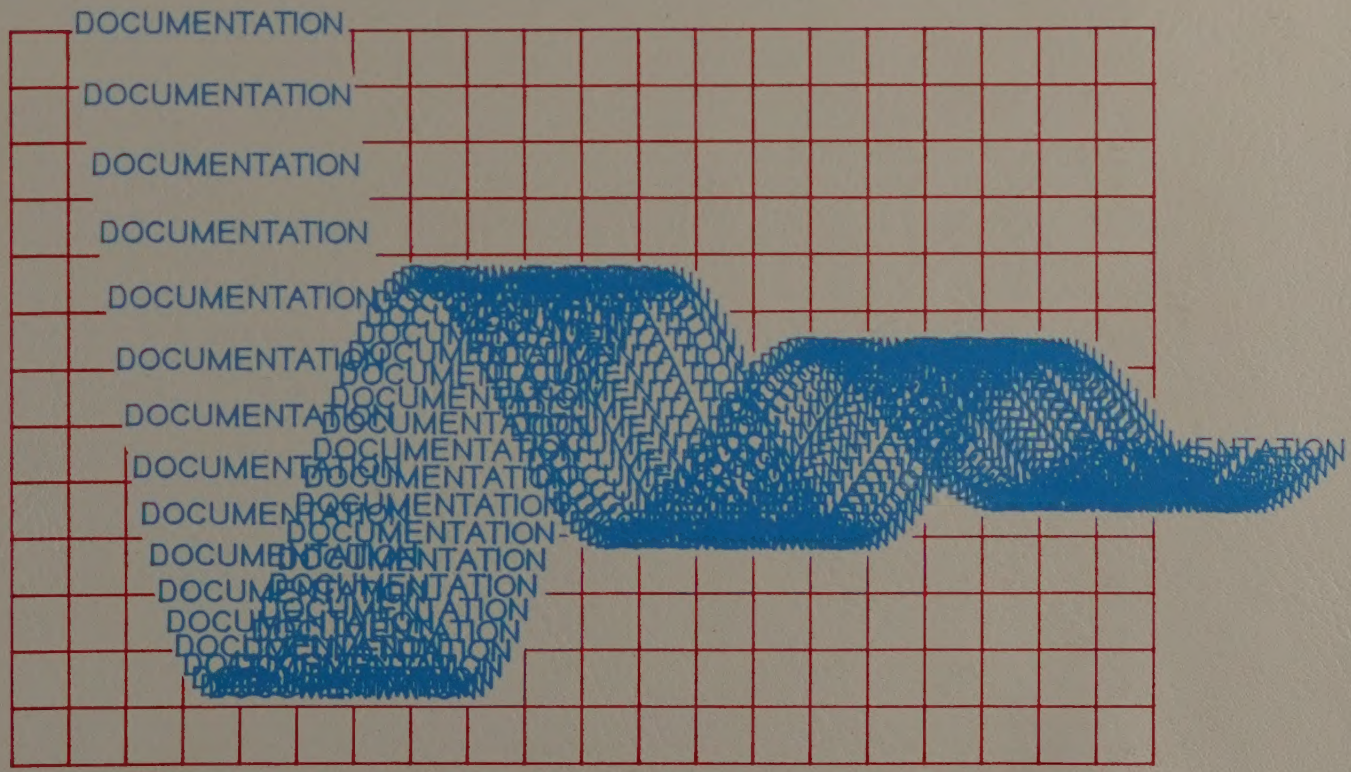


ROHDE&SCHWARZ
Test and Measurement
Division

Software Manual

GSM/DCS/PCS Base Station Tests

Application Firmware Module FSE-K11

Measurement according to Transmission Standards

1057.3392.02

Printed in the Federal
Republic of Germany

Safety Instructions

This unit has been designed and tested in accordance with the EC Certificate of Conformity and has left the manufacturer's plant in a condition fully complying with safety standards.

To maintain this condition and to ensure safe operation, the user must observe all instructions and warnings given in this operating manual.

1. The unit may be used only in the operating conditions and positions specified by the manufacturer. Unless otherwise agreed, the following applies to R&S products:

   Pollution severity 2, overvoltage category 2, IP degree of protection 2X, altitude max. 2000 m.

   The unit may be operated only from supply networks fused with max. 16 A.

2. For measurements in circuits with voltages V_{rms} > 30 V, suitable measures should be taken to avoid any hazards.

   (using, for example, appropriate measuring equipment, fusing, current limiting, electrical separation, insulation).

3. If the unit is to be permanently wired, the PE terminal of the unit must first be connected to the PE conductor on site before any other connections are made (installation and cabling of the unit to be performed only by qualified technical personnel).

4. For permanently installed units without built-in fuses, circuit breakers or similar protective devices, the supply circuit must be fused such as to provide suitable protection for the users and equipment.

5. Prior to switching on the unit, it must be ensured that the nominal voltage set on the unit matches the nominal voltage of the AC supply network.

   If a different voltage is to be set, the power fuse of the unit may have to be changed accordingly.

6. Units of protection class I with disconnectible AC supply cable and appliance connector may be operated only from a power socket with earthing contact and with the PE conductor connected.

7. It is not permissible to interrupt the PE conductor intentionally, neither in the incoming cable nor on the unit itself as this may cause the unit to become electrically hazardous.

   Any extension lines or multiple socket outlets used must be checked for compliance with relevant safety standards at regular intervals.

8. If the unit has no power switch for disconnection from the AC supply, the plug of the connecting cable is regarded as the disconnecting device. In such cases it must be ensured that the power plug is easily reachable and accessible at all times (length of connecting cable approx. 2 m). Functional or electronic switches are not suitable for providing disconnection from the AC supply.

   If units without power switches are integrated in racks or systems, a disconnecting device must be provided at system level.

9. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all work performed.

   Prior to performing any work on the unit or opening the unit, the latter must be disconnected from the supply network.

   Any adjustments, replacements of parts, maintenance or repair may be carried out only by authorized R&S technical personnel.

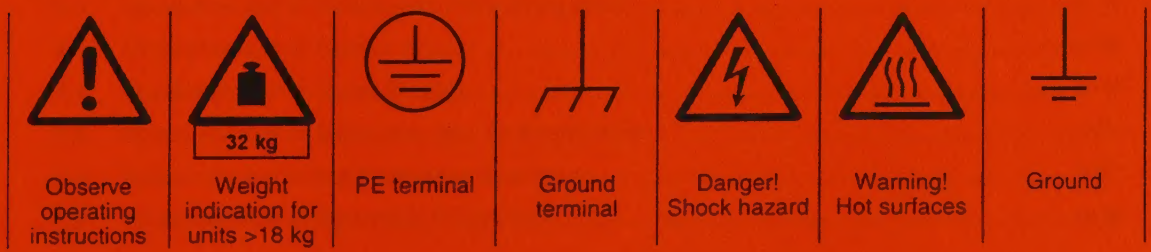
   Only original parts may be used for replacing parts relevant to safety (eg power switches, power transformers, fuses). A safety test must be performed after each replacement of parts relevant to safety.

   (visual inspection, PE conductor test, insulation-resistance, leakage-current measurement, functional test).

10. Ensure that the connections with information technology equipment comply with IEC950/EN60950.

11. Any additional safety instructions given in this manual are also to be observed.

Safety-related symbols used on equipment and documentation from R&S:



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ISO 9001

DQS REG. NO 1954-04

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1 Getting Started

This chapter is mainly intended for operators using the GSM BTS analyzer mode for the first time. Operators are guided step by step through the most frequent base station tests.

The chapter describes FSE setup, relevant settings and individual measurements.

Layout and content are application-oriented and provide important information on FSE as well as the GSM/DCS1800/PCS1900 system.

It is recommended to read through this chapter and perform the operations on the FSE at the same time. This ensures a simple and rapid introduction to the GSM BTS firmware functions so that correct and useful measurement results are achieved.

Some of the steps are provided with reference numbers, eg ①, relating to a more detailed information on the opposite page.

For more detailed information on the individual menus and keys kindly refer to the reference part in chapter 2.

1.1 Connecting the FSE

1.1.1 Standard Test Setup

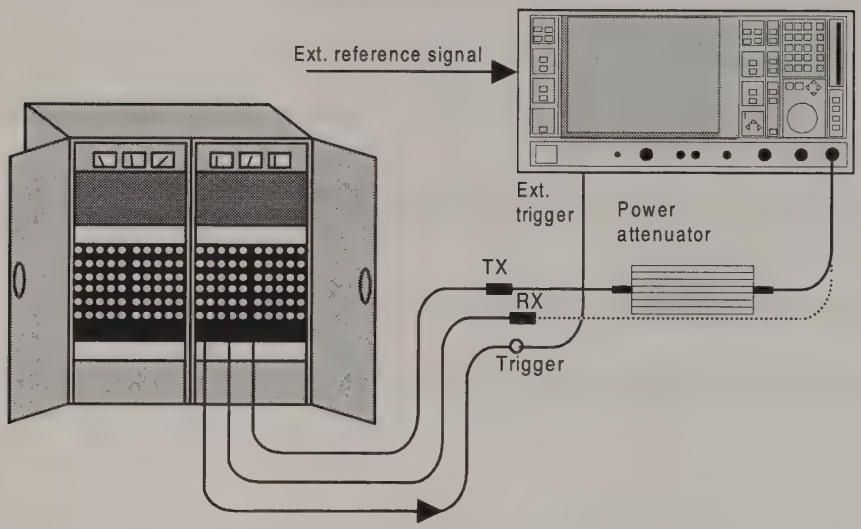


Fig. 1-1 BTS with separate RX input and TX output (connections for measurements in the RX band shown as dotted lines)

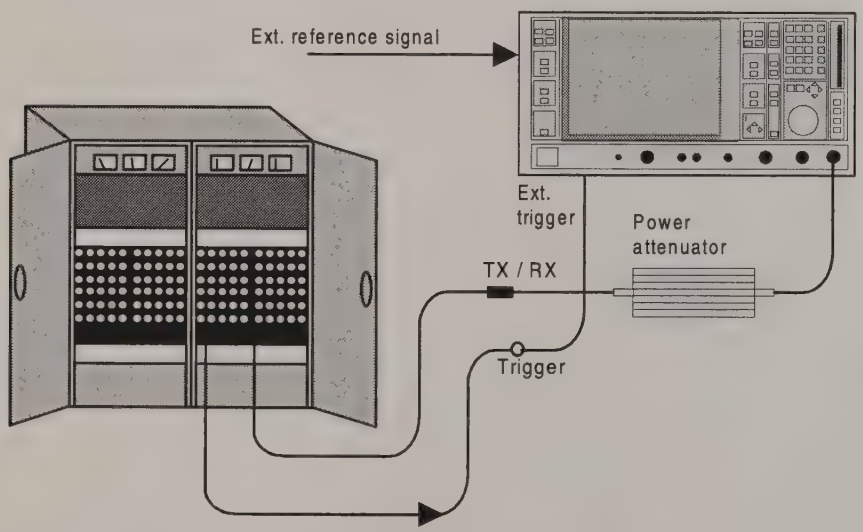


Fig. 1-2 Test setup for BTS with combined RX/TX input/output.

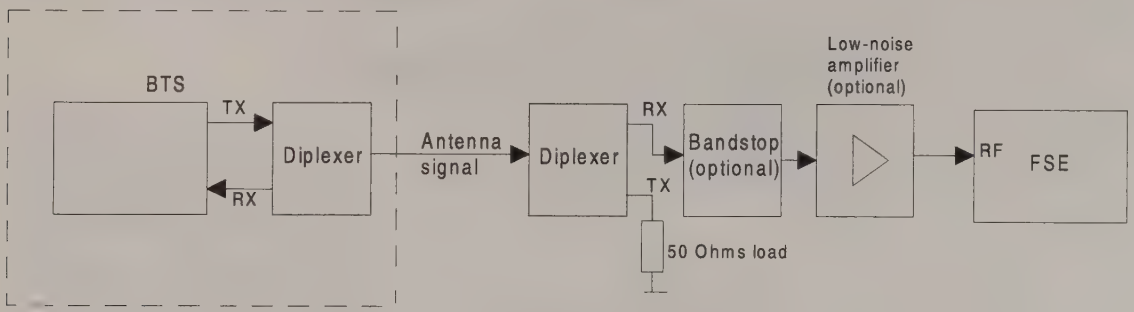
Note: *Another test setup is required for measurements in the RX band (see sections 1.1.2 and 1.1.3)*

➢ Connect the frame trigger output of the BTS to the rear-panel BNC connector:
EXT TRIG GATE (external trigger or gate input) of the FSE.
With the aid of this external trigger signal FSE is able to trigger exactly to any slot even if several slots of the frame are occupied.

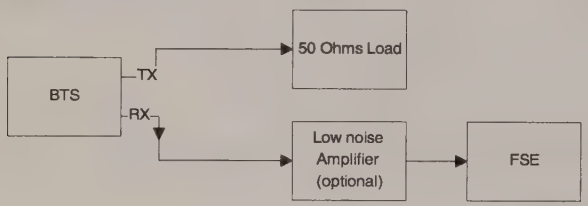
➢ Connect the antenna output (or TX output) of the BTS via a suitable power attenuator to the RF input of FSE (except for measurements in the RX band; special test setup).

1.1.2 Test Setup for Measurements in the RX Band (Spurious ① and Modulation Spectrum)

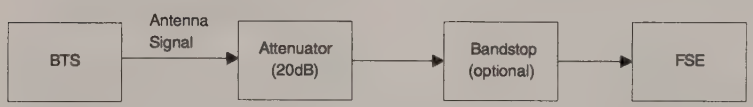
RX-band test setup for BTSs with combined RX/TX input/output:



RX-band test setup for BTSs with separate RX input and TX output:



1.1.3 Test Setup for Measuring Spurious in the TX and outside the TX/RX Band (<>TX band)



Additional information

① The stringent requirements for measurements of spurious in the RX band on BTSs using a combined RX input/TX output demand adequate suppression of the carrier signal(s) (max. carrier level < -10 dBm at the FSE input), eg with the aid of bandstop filters and/or diplexers. Since the requirements for GSM phase 1 are more severe than those for phase 2, an external low-noise preamplifier may be required in addition because of the higher noise floor of FSEB, FSEM and FSEK compared to FSEA.

With BTSs using a ***separate*** RX input, the TX channel is sufficiently suppressed at the RX input.

To obtain maximum sensitivity, 0 dB attenuation is selected when RX BAND is set on the FSE.

Softkey *RX BAND GAIN* defines the gain of the external preamplifier (or in the case of negative values the insertion loss of the preceding diplexers and bandstop filters), which is then taken into account in the FSE display.

The attenuation of the external attenuator entered under Settings is ignored when the RX band is measured.

Caution: *The level at the FSE input of +20 dBm with a 0 dB input attenuator must under no circumstances be exceeded.*

The following warning is output when the RX-BAND softkey is pressed.

Caution:

Ext. attenuation ignored, disconnect ext. attenuator

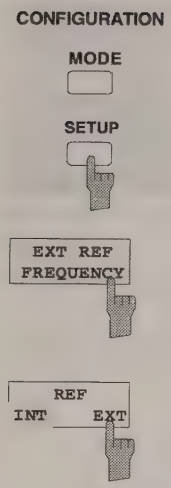
Connect bandpass or bandstop to suppress TX band!

Notes on amplifier:

The noise figure of the preamplifier should be as low as possible (LF < approx. 6 dB) and the gain in the range 15 to 25 dB so that the noise floor of FSE (approx. 15 to 17 dB with FSEA30, approx. 18 to 21 dB with FSEB/M/K30) can be neglected.

Make sure that the preamplifier is not overdriven by insufficiently suppressed TX signals (for this reason the amplifier gain should not be too high).

1.2 Presetting the FSE



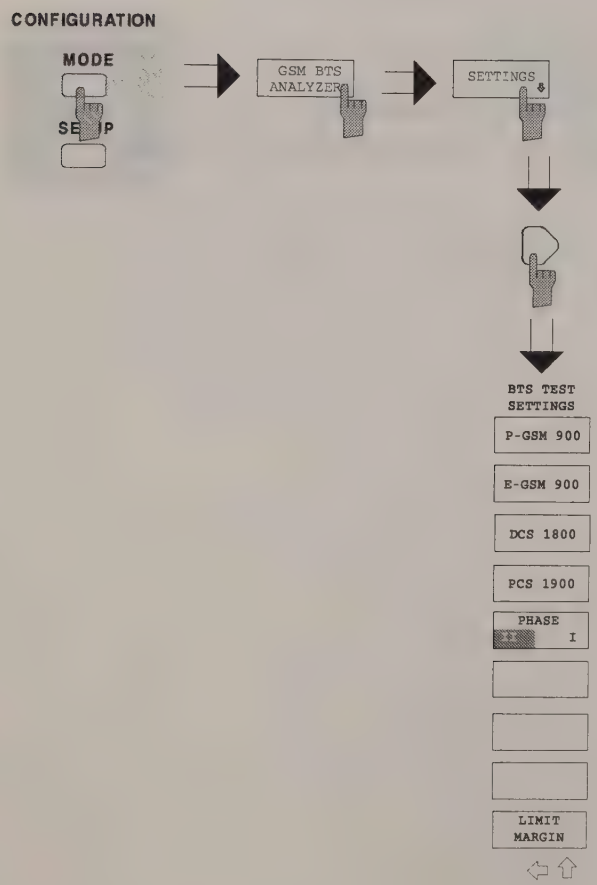
Step 1

Setting the reference frequency

➢ Press the SETUP key.

➢ Press softkey *EXT. REF FREQUENCY* ① and enter the frequency depending on the available frequency standard.

➢ Switch softkey *REF INT/EXT* to EXT (external reference frequency).



Step 2

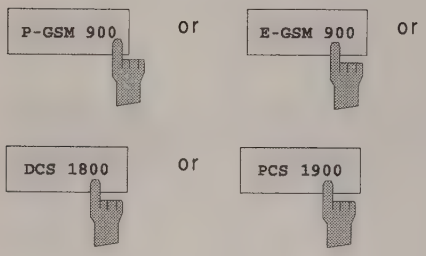
Selecting the standard

➢ Press the *MODE* key and softkeys GSM BTS ANALYZER and SETTINGS one after the other and then ▷. The menu for selecting the various standards is displayed.

Additional information

Step 1

① To attain the required frequency accuracy in the frequency error measurement *(PHASE/FREQ ERROR)* a highly accurate (deviation < $1*10^{-9}$) external reference frequency n x 1 MHz with n = 1, 2,...16 has to be applied to the FSE.



Step 3

➢ Select standard P-GSM900, E-GSM900, DCS 1800 or PCS 1900, depending on the BTS to be tested. With P-GSM900 and DCS 1800 select either Phase I or Phase II.

Press ◁ to return to the SETTINGS menu.

Step 4

Entering the external attenuation

➢ Press the *EXTERNAL ATTEN.* softkey.

➢ Enter the external attenuation. (For recommended attenuation see ②)

Additional information

Step 4

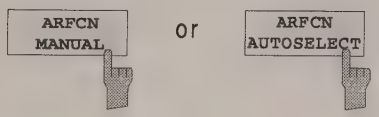
② The following values are recommended for the external attenuator to ensure that the FSE RF input is protected and the sensitivity of the FSE is not reduced too much.
The FSE level display is automatically corrected by the entered value.

Max. power	Recommended ext. attenuation
≥ 55 to 60 dBm	35 to 40 dB
≥ 50 to 55 dBm	30 to 35 dB
≥ 45 to 50 dBm	25 to 30 dB
≥ 40 to 45 dBm	20 to 25 dB
≥ 35 to 40 dBm	15 to 20 dB
≥ 30 to 35 dBm	10 to 15 dB
≥ 25 to 30 dBm	5 to 10 dB
≥ 20 to 25 dBm	0 to 5 dB
< 20 dBm	0 dB

Step 5

Selecting the transmission channel

➢ Press the ARFCN softkey.



➢ Press softkey *ARFCN MANUAL or ARFCN AUTOSELECT.*

With *ARFCN MANUAL* selected:

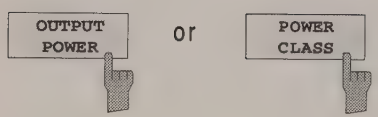
➢ Enter the transmission channel number of your base station. ③
FSE will tune to this frequency in compliance with the selected standard.

With *ARFCN AUTOSELECT*, FSE automatically searches for the active transmission channel on condition that frequency hopping is not active and that at least one slot is occupied.

Press ◁ to return to the SETTINGS menu.

Step 6

Setting FSE to output power of BTS



➢ Press softkey *OUTPUT POWER* or *POWER CLASS* and enter the maximum output power or power class of the BTS. ④

Additional information

Step 5

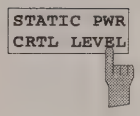
③ Enter one of the possible channel numbers 1 to 124 for the GSM frequency range. Enter a number between 975 and 1023 or 0 for the extended GSM band. For PCN (DCS1800) the numbers 512 to 885 are available, for PCS1900 numbers 512 to 810.

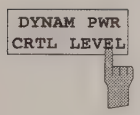
Range	Channel number n	Frequency downlink (BS-->MS)	Duplex offset
GSM	1 to 124	f = 935 MHz + (n * 0.2 MHz)	- 45 MHz
E-GSM	0 to 124	f = 935 MHz + (n * 0.2 MHz)	- 45 MHz
E-GSM	975 to 1023	f = 935 MHz + ((n to 1024) * 0.2 MHz)	- 45 MHz
DCS1800	512 to 885	f = 1805.2 MHz + ((n to 512) * 0.2 MHz)	- 95 MHz
PCS1900	512 to 810	f = 1930.2 MHz + ((n to 512) * 0.2 MHz)	- 80 MHz

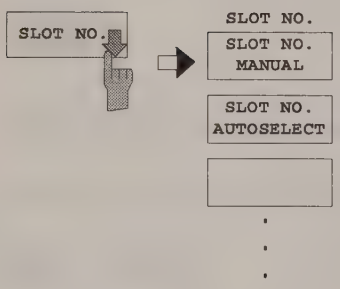
Step 6

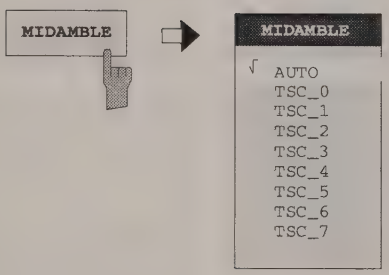
④ The power classes which can be allocated to the various standards and the associated peak power values are indicated in the following table:

Power Class	Peak power P-GSM 900 Phase 1	P-GSM 900 - Phase 2 E-GSM 900 - Phase 2	DCS1800 Phase 1	DCS1800 - Phase 2	PCS1900 (Watt)	PCS1900 (dBm)
1	320 W (55 dBm)	320 W (55 dBm)	20 W (43 dBm)	20 to (<40W) 43 to < 46 dBm	20≤P0≤40	43≤P0≤46
2	160 W (52 dBm)	160 W (52 dBm)	10 W (40 dBm)	10 to (<20W) 40 to < 43 dBm	10≤P0≤20	40≤P0≤43
3	80 W (49 dBm)	80 W (49 dBm)	5 W (37 dBm)	5 to (< 10W) 37 to < 40 dBm	5≤P0≤10	37≤P0≤40
4	40 W (46 dBm)	40 W (46 dBm)	2.5 W (34 dBm)	2.5 to (<5W) 34 to < 37 dBm	2≤P0≤5	33≤P0≤37
5	20 W (43 dBm)	20 W (43 dBm)	--	--		
6	10 W (40 dBm)	10 W (40 dBm)	--	--	0.5≤P0≤1.6	27≤P0≤32
7	5 W (37 dBm)	5 W (37 dBm)	--	--	0.16≤P0≤0.5	22≤P0≤27
8	2.5 W (34 dBm)	2.5 W (34 dBm)	--	--	0.05≤P0≤0.16	17≤P0≤22
M1		(>0.08) to 0.25 W (> 19) to 24 dBm	--	(>0.5) to 6W (>27) to 32 dBm		
M2		(0.03) to 0.08 W (> 14) to 19 dBm	--	(>0.16) to 0.5W (>22) to 27 dBm		
M3		(>0.01) to 0.03W (> 9) to 14 dBm	--	(>0.05) to 0.16 W (>17) to 22dBm		









Step 7

With reduced level of the BTS enter the static and/or the dynamic power control level in addition. (The default setting is 0) ⑤:

- Enter the desired static power control level N (integer, N = 0, 1, 2 to 6). ⑤

- Enter the desired dynamic power control level N (integer, N = 0, 1, 2 to 15). ⑥

Step 8

- Press softkey *SLOT NO.*

- Select the desired slot number 0 to 7 using *SLOT NO. MANUAL* or start the automatic search with *SLOT NO. AUTO SELECT.* ⑦
  The FSE thus knows in which slot the measurement should be performed.

Step 9

Selecting the current midamble

- Press softkey *MIDAMBLE.*
  The table of training sequences *(midamble)* is displayed. ⑧

In the position AUTO (default setting) FSE uses the training sequence (midamble) according to the slot number, for instance TSC_2 for slot number 2.

- If you wish to use another training sequence, select it accordingly.

Additional information

Step 7

⑤

Static power control level	Relative power referred to maximum output power (GSM/DCS/PCS)
0	0 dB
1	-2 dB
2	-4 dB
3	-6 dB
4	-8 dB
5	-10 dB
6	-12 dB

⑥ Max. 16 dynamic power control levels are specified in addition to the static power control levels. They reduce the base station level referred to the maximum output power of the base station and the static power control level in up to 16 steps of 2 dB (dynamic power control level N = 0 to 15, attenuation = N × 2 dB).

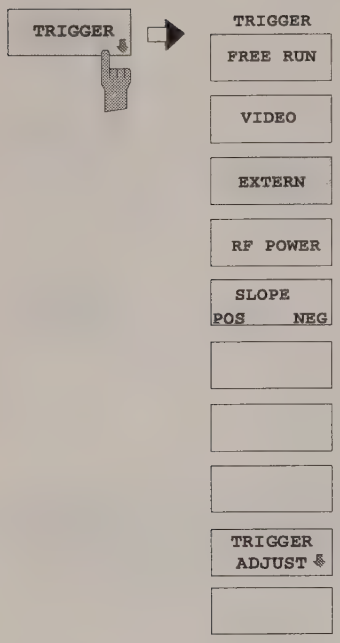
Step 8

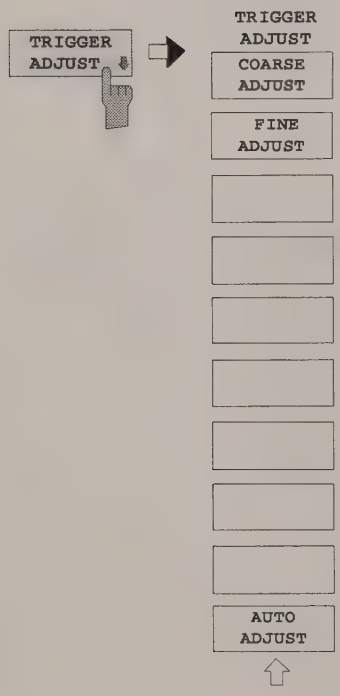
⑦ A precondition for automatic search is that only one slot is active.

Step 9

⑧ Table for the midamble used in the GSM system:

NAME	PATTERN (Bit No.: 61 to 86)
TSC_0	0 0 1 0 0 1 0 1 1 1 0 0 0 0 1 0 0 0 1 0 0 1 0 1 1 1
TSC_1	0 0 1 0 1 1 0 1 1 1 0 1 1 1 1 0 0 0 1 0 1 1 0 1 1 1
TSC 2	0 1 0 0 0 0 1 1 1 0 1 1 1 0 1 0 0 1 0 0 0 0 1 1 1 0
TSC 3	0 1 0 0 0 1 1 1 1 0 1 1 0 1 0 0 0 1 0 0 0 1 1 1 1 0
TSC_4	0 0 0 1 1 0 1 0 1 1 1 0 0 1 0 0 0 0 0 1 1 0 1 0 1 1
TSC_5	0 1 0 0 1 1 1 0 1 0 1 1 0 0 0 0 0 1 0 0 1 1 1 0 1 0
TSC_6	1 0 1 0 0 1 1 1 1 1 1 0 1 1 0 0 0 1 0 1 0 0 1 1 1 1 1
TSC_7	1 1 1 0 1 1 1 1 0 0 0 1 0 0 1 0 1 1 1 0 1 1 1 1 0 0





Step 10

Setting the trigger

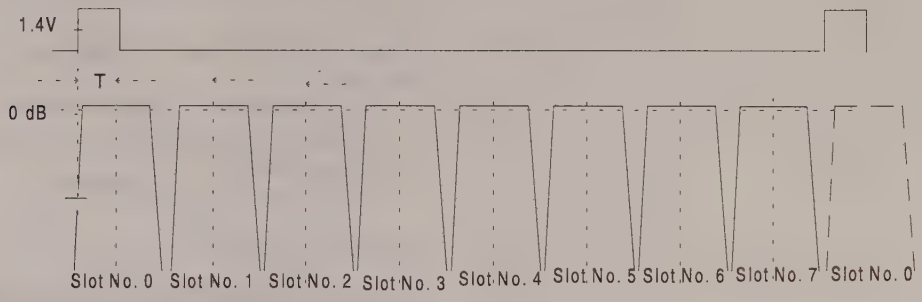
➢ Press softkey *TRIGGER*.
An external trigger signal (frame trigger of BTS) is required for almost all measurements. ⑨
The frame trigger defines the frames with bit 0 in slot 0.
The default setting for the trigger is therefore EXTERN.
The default value for the external trigger level is 1.4 V but, if required, the level can be adapted by pressing *EXTERN* and then entering a new value in the data entry field.
The polarity of the trigger signal can be set using softkey *SLOPE POS NEG*.
Default setting: positive slope.

➢ Press softkey *TRIGGER ADJUST* to set the trigger reference. Automatic (preferably) or manual adjustment can be performed.

Additional information

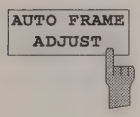
Step 10

⑨ External frame trigger



Transition from bit 73 to 74

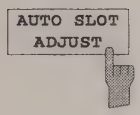
Delay between burst edge and transitionbit 13/14 dof midamble of slot N (where N=0,1,2...7):
T=<283.23us>+N*576.92 us



Either automatic adjustment:

➢ Press softkey *AUTO FRAME ADJUST*. FSE sets the time reference between trigger signal and midamble and takes this reference into account for all measurements.
AUTO FRAME ADJUST acts upon all slots.

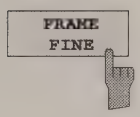
If only the slot used at present is to be adjusted:



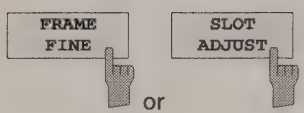
➢ Press softkey *AUTO SLOT ADJUST* and adjust the time reference of the slot used at present.

or manual adjustment:

(if automatic adjustment is not possible, eg with bursts without midamble or when option FSE-B7 is not installed.)



➢ Press softkey *FRAME COARSE* and set the time reference of the external trigger to the frame with the aid of the spinwheel (the -20 dB point of the rising burst edge should be in the display center. This point is marked by crosshairs made up of the vertical screen center line and the -20 dB line).



➢ Press softkey *FRAME FINE* and adjust the time reference of all slots in the same way. ⑩

If the slots have a different length (156 or 157 bits), a fine adjustment can be performed for each slot with the aid of *SLOT ADJUST*.

FSE is now set as required by the BTS to be measured and measurements can be started.

Additional information

⑩

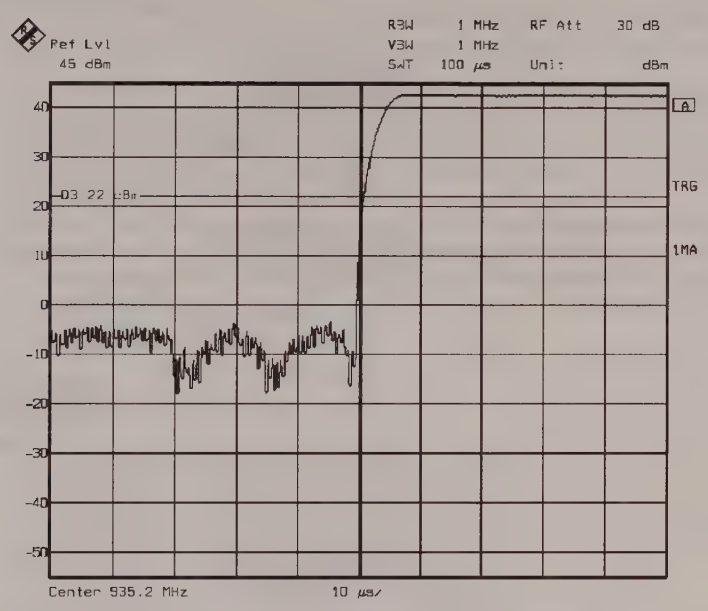
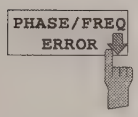


Fig. 1-3 Correct trigger adjustment for FRAME FINE

Note: *The manual adjustment to the -20 dB point of the trigger edge can yield only an approximate time reference since the exact reference to the midamble is missing. The automatic adjustment produces the correct time reference to the midamble (depending on the steepness of the burst edge the -20 dB point can be up to approx. 7 µs away from the screen center).*

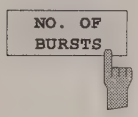
1.3 Measuring the Phase/Frequency Error ①

Note: *The phase and frequency error can only be measured if the Vector Signal Analyzer option FSE-B7 is integrated.*



Step 1

➢ Press the softkey *PHASE/FREQ ERROR.*

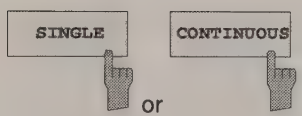


Step 2

➢ Press softkey *NO. OF BURSTS* and set the number of measurements to be carried out.
Default setting: *NO. OF BURSTS* = 1.

Press ◁ to return to the SETTINGS menu.

Step 3



➢ Start the measurement sequence with *SINGLE* or *CONTINUOUS.*

When the measurement is completed, an overview of the numeric modulation errors is displayed in result window A for the 147 useful bits. ②

Additional information

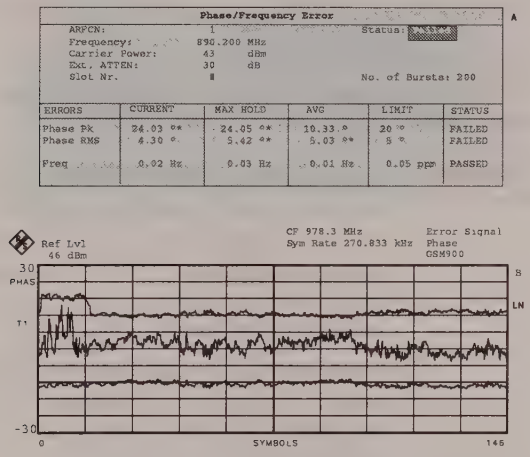
① **BTS setting:**

At least 1 slot on the selected ARFCN must be active. All slots may be occupied.

The measurement can also be performed on BTSs with active SFH (slow frequency hopping). FSE measures at the set receive frequency (ARFCN). If a number of bursts > 1 is set, only results are considered at which FSE is able to synchronize. Thus even if the carrier frequency of the slot to be measured changes cyclically in successive frames, only slots with the set slot number at the selected ARFCN will be considered in the measurement.
However, this will considerably slow down the measurement sequence (approx. by the factor 8 against a non-hopping BTS). This disadvantage can be avoided if a trigger signal is provided for the FSE (triggering not on every frame but only if the selected slot is at the set ARFCN).

Step 3

②



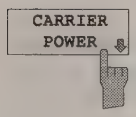
The information on instantaneous frequency and power and the following numerical results are displayed in the window. It also contains the corresponding limit values and pass/fail information.

- Max. hold and average value of peak phase error
- Max. hold and average value of rms phase error
- Max. hold and average value of frequency error

The phase error versus time is displayed in window B over the 147 useful bits of the normal burst. Three traces are simultaneously displayed.

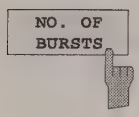
- Trace 1: Clear Write (instantaneous phase error)
- Trace 2: Max Hold (maximum positive phase error of all measured bursts)
- Trace 3: Min Hold (maximum negative phase error of all measured bursts)

1.4 Measuring the Average Carrier Power ①



Step 1

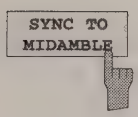
➢ Press softkey *CARRIER POWER*.



Step 2

➢ Press softkey *NO. OF BURSTS* and set the desired number of measurements.
Default setting: *NO. OF BURSTS* = 1.

Press ◁ to return to the SETTINGS menu.

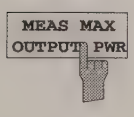


Step 3

Possible only if option FSE-B7 is installed

➢ Activate softkey *SYNC TO MIDAMBLE* and set synchronization to the burst midamble if the burst to be measured contains a midamble and a bit-accurate time reference is required (softkey colour: green).

➢ Disable SYNC TO MIDAMBLE for bursts without midamble or if maximum measurement speed is required (softkey colour: grey). ②



Step 4

➢ The reference level for power control level 0 (static and dynamic) is determined with *MEAS MAX OUTPUT PWR* and checked for compliance with the permissible tolerance against the level entered with softkey *OUTPUT POWER* or *POWER CLASS* in the *BTS TEST SETTINGS* menu.

Additional information

① **BTS setting:**

At least three neighbouring slots of a TDMA frame of equal power must be active.
If the BTS supports SFH (slow frequency hopping), SFH should be selected.

FSE measures at the set receive frequency (ARFCN). If a number of bursts > 1 has been set, only measurement results will be considered at which FSE is able to synchronize. Thus even if the carrier frequency of the slot to be measured changes cyclically in successive frames, only slots with the set slot number at the selected ARFCN will be considered in the measurement.

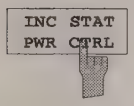
However, this will considerably slow down the measurement sequence (approx. by the factor 8 compared to a BTS without SFH). This disadvantage can be avoided if a trigger signal is provided for the FSE (triggering not on every frame but only if the selected slot is at the set ARFCN).

Step 3

② **Explanation concerning SYNC TO MIDAMBLE:**

If option FSE-B7 is built in and the softkey is active, FSE synchronizes to the midamble of the vector signal analyzer. Power measurement is performed in the scalar spectrum analyzer mode by means of the time reference obtained by th signal demodulation.

Thus an accurate and updated time reference is ensured. If the softkey is not active, the vector analyzer mode is off and FSE uses the time reference set using ADJUST TRIGGER.



Step 5

➢ The average carrier power is measured at incremented static power control levels (1, 2, 3, 4, 5, 6) and checked for compliance with limit values. To do so the BTS level must be reduced each time by one step in interactive mode and softkey *INCR STAT PWR CTRL* has then to be pressed for the measurement. ③

Step 6

➢ In interactive mode, set the BTS accordingly for the measurements at incremented dynamic power control levels (at a specific static power control level) and press softkey *INC DYNC PWR CTRL* fifteen times.④
After this has been done for static power control level 6, the display is switched from split-screen to full-screen display.

➢ The table can be scrolled using the spinwheel or keys ⇧ and ⇩.

Additional information

Step 5

③ When the measurement is completed (after pressing INCR STAT PWR CTRL seven times and reducing accordingly the BTS level) a result table similar to the one below is displayed:

P-GSM 900 II	CARRIER POWER			
ARFCN:	1		Status:	PASSED
Frequency:	935.20000	MHz		
Carrier Power:	46.0	dBm	Conditions:	NORMAL
Ext Atten:	40.0	dB	No of Bursts:	1

PWR CTRL LEVEL Static	Dynamic	ABS PWR dBm	DELTA STEP dB	Status
0	0	45.89		PASSED
1	0	44.23	-1.66	PASSED
2	0	42.16	-2.07	PASSED
3	0	40.15	-2.01	PASSED
4	0	38.34	-1.81	PASSED
5	0	36.24	-2.10	PASSED
6	0	34.11	-2.13	PASSED

Step 6

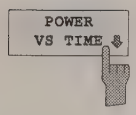
④ The table below is an example showing the incrementation of the static power control level (to 1), then of the dynamic power control levels (to 15) and then again of the static power control level (to 6).

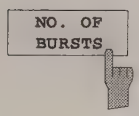
P-GSM 900 II	CARRIER POWER			
ARFCN:	1		Status:	FAILED
Frequency:	935.20000	MHz		
Carrier Power:	46.0	dBm	Conditions:	NORMAL
Ext Atten:	40.0	dB	No of Bursts:	1

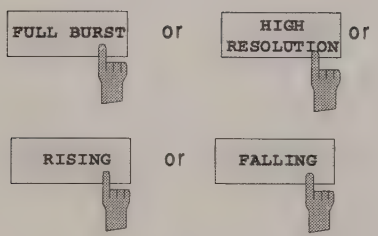
PWR CTRL LEVEL Static	Dynamic	ABS PWR dBm	DELTA STEP dB	Status
0	0	46.00		PASSED
1	0	44.22	-1.78	PASSED
1	1	42.16	-2.06	PASSED
1	2	40.15	-2.01	PASSED
1	3	38.35	-1.80	PASSED
1	4	36.25	-2.10	PASSED
1	5	34.10	-2.15	PASSED
1	6	32.01	-2.09	PASSED
1	7	29.97	-2.04	PASSED
1	8	27.93	-2.04	PASSED
1	9	25.77	-2.16	PASSED
1	10	23.48	-2.29	PASSED
1	11	21.34	-2.14	PASSED
1	12	19.26	-2.08	PASSED
1	13	17.25	-2.01	PASSED
1	14	15.03	-2.22	PASSED
1	15	12.78	-2.25	PASSED
2	0	40.14	-4.08*	>FAILED<
3	0	38.34	-1.80	PASSED
4	0	36.23	-2.11	PASSED
5	0	34.10	-2.13	PASSED
6	0	32.02	-2.08	PASSED

Example: *Measurement of dynamic power control level at static power control level 1. The dynamic power control levels may be incremented at all static power control levels or only at the desired ones. The measurement sequence is terminated if the* INC STAT PWR CTRL *softkey is pressed again at the static power control level 6 or at the dynamic power control level 15 and the static power control level 6.*

1.5 Measuring the Carrier Power versus Time ①







Step 1

➢ Press softkey *POWER VS TIME.*

Step 2

➢ Press softkey *NO. OF BURSTS* and set the number of bursts to be measured. Default setting: *NO. OF BURSTS* = 1.

Press ◁ to return to the SETTINGS menu.

Step 3

Possible only if option FSE-B7 is installed

➢ Activate softkey *SYNC TO MIDAMBLE* and set synchronization to the burst midamble if the burst to be measured contains a midamble and a bit-accurate time reference is required.

➢ Switch off SYNC TO MIDAMBLE for bursts without midamble or if maximum measurement speed is required. ②

Step 4

➢ Select the resolution for the display of bursts:

- *FULL BURST*: The complete burst is displayed
- *HIGH RESOLUTION*: The 147 useful bits are displayed with 1 dB level resolution.
- *RISING: Display of the rising burst edge with high time resolution.*
- *FALLING*: Display of the falling burst edge with high time resolution.

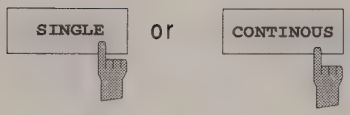
Additional information

① **BTS setting:**

A single timeslot should be active on the transceiver (TRX) to be measured, all other timeslots of the TDMA frame should be set to IDLE.
The measurement can also be performed if the BTS is in the SFH mode.

Step 3

② FSE measures at the set receive frequency (ARFCN). If a number of burst > 1 is set only results are considered at which FSE is able to synchronize (only if softkey *SYNC TO MIDAMBLE* is active). Thus even if the carrier frequency in the slot to be measured changes cyclically in successive frames, only slots with the set slot number at the selected ARFCN will be considered in the measurement.
However, this will considerably slow down the measurement sequence (approx. by the factor 8 compared to SFH off). This disadvantage can be avoided if a trigger signal is provided for the FSE (triggering not only on every frame but if the selected slot is at the set ARFCN). In this case measurement on the midamble can be performed in the slow frequency hopping mode without synchronization.



Step 5

➢ Press softkey *SINGLE* to start *a single measurement sequence or CONTINUOUS for a continuous measurement sequence.* ③
The bursts are displayed according to the selection made at step 4.

Additional information

Step 5

③

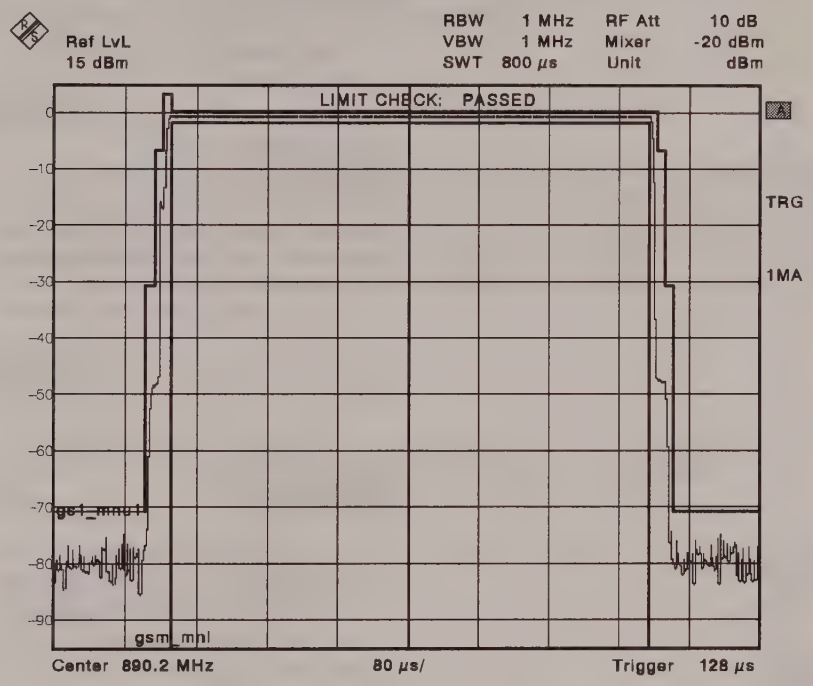
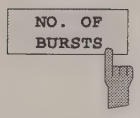
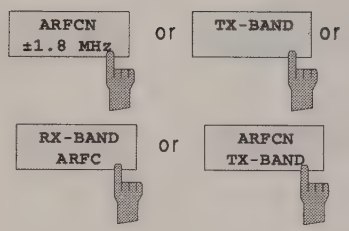


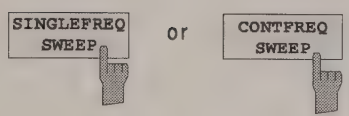
Fig. 1-4 Display of burst for *FULL BURST*

1.6 Measuring the Spectrum due to Modulation ①

Note: *The test setup is described in section 1.1.*







Step 1

➢ Press softkey *MODULATION SPECTRUM.* ②

Step 2

➢ Press softkey *NO. OF BURSTS* and determine the number of bursts to be measured.
Default setting: *NO. OF BURSTS* = 1.

Press ◁ to return to the SETTINGS menu.

Step 3

➢ Select the frequency range for the measurement: *ARFCN ± 1.8 MHz*, *TX-BAND*, *RX-BAND* or combined band *ARFCN ± 1.8 MHz/TX BAND*. (RX band possible only with GSM/DCS phase 1).

➢ **Caution:** *The test setup is changed for measurement in RX band.*

Step 4

➢ Start the measurement in the frequency range (overview measurement) with *SINGLE FREQ SWEEP* (single sweep) or *CONT FREQ SWEEP* (continuous sweep). ③

Additional information

① **BTS setting:**

Set all timeslots of a TDMA frame to the same power and modulate them with pseudo-random data.
(Exception: timeslot 0 may also be modulated with normal BCCH data).
SFH (slow frequency hopping) should be switched off.

Step 1

② The measurement is performed as prescribed by excluding the midamble of 50 to 90 % of the burst.
(Precondition: correct setting of Adjust Trigger in the SETTINGS menu; step 1 ⑦).
If required, the setting can be checked and corrected using the *ADJUST TRIGGER* softkey.
The measurement can be performed as a spectral display measurement or, depending on the standard, as a zero-span measurement with subsequent output of tabulated numerical results.

Step 4

③ A spectral display is not possible in the combined band *ARFCN ± 1.8 MHz/TX-BAND* (softkeys *SINGLE FREQ SWEEP*, *CONT FREQ SWEEP* cannot be operated).

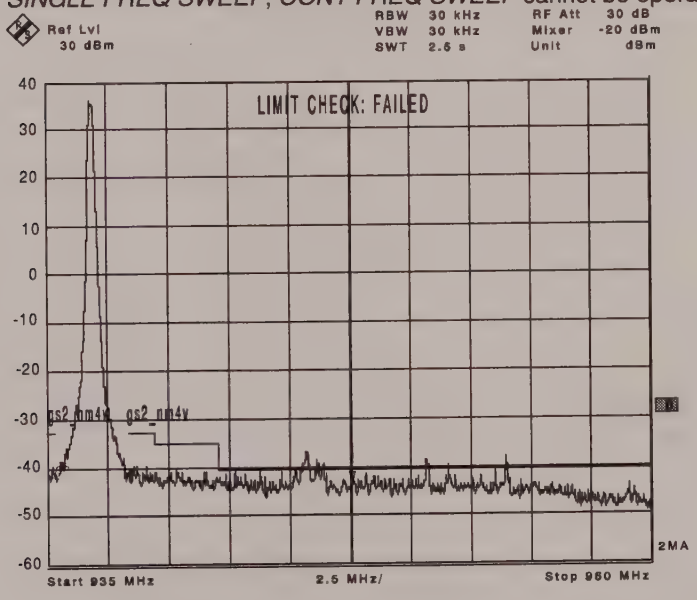
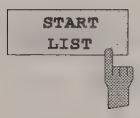


Fig. 1-5 Spectral display (*SINGLE FREQ SWEEP*) in the range *ARFCN ± 1.8 MHz*

Step 5



➢ Start the strictly standard-conforming zero-span measurement with *START LIST:* ④

Additional information

Step 5

④

MODULATION SPECTRUM LIST: ARFCN ±1.8 MHz

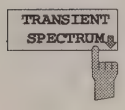
ARFCN:	512		Status:	FAILED	
Frequency:	1.93020 GHz				
Carrier Power:	46.0 dBm		Ext. Att/Gain:	40.0 dB	
Ref Pwr (RBW 30 kHz)	45.22 dBm		No. of Bursts:	1	

No.	Offset Freq.	+Offset	-Offset	Limit	Status
	100 kHz	-35.5 dB	-36.8 dB	0.5 dB	PASSED
	200 kHz	-44.8 dB	-42.3 dB	-30.0 dB	PASSED
	250 kHz	-50.6 dB	-50.3 dB	-33.0 dB	PASSED
	400 kHz	-64.8 dB	-66.9 dB	-60.0 dB	PASSED
1	600 kHz	-23.5 dBm*	-21.9 dBm*	-70.0 dB	>FAILED<
2	800 kHz	-73.8 dB	-71.5 dB *	-70.0 dB	MARGIN
3	1000 kHz	-74.1 dB	-72.5 dB *	-70.0 dB	MARGIN
4	1200 kHz	-77.3 dB	-75.6 dB *	-73.0 dB	MARGIN
5	1400 kHz	-74.6 dB *	-74.8 dB *	-73.0 dB	MARGIN
6	1600 kHz	-76.9 dB	-74.8 dB *	-73.0 dB	MARGIN
7	1800 kHz	-75.3 dB *	-77.0 dB *	-75.0 dB	MARGIN

Fig. 1-6 Result display for zero-span measurement (*START LIST*) in the range *ARFCN ±1.8 MHz*

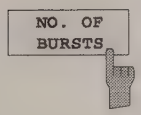
1.7 Measurement of Spectrum due to Transients ①

Note: *The test setup is described in section 1.1.*



Step 1

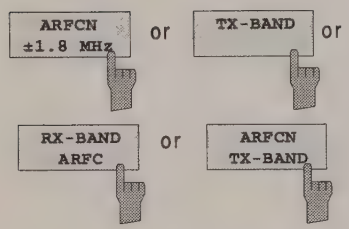
➢ Press softkey *TRANSIENT SPECTRUM.*



Step 2

➢ Press softkey *NO. OF BURSTS* and determine the number of bursts to be measured.
Default setting: *NO. OF BURSTS* = 1.

Press ◁ to return to the SETTINGS menu.



Step 3

②

➢ Press softkey *SINGLE FREQ SWEEP* or *CONT FREQ SWEEP.* ③
The measurement is started in the frequency range selected in step 3 (spectral display).

Alternatively:

➢ Press softkey *START LIST.*
A zero-span measurement is started ③.

Additional information

① **BTS setting:**

The measurement can be performed with or without SFH (slow frequency hopping) as required. The FSE measurement routine is able to handle the two cases.
According to the standards, the slots of a TDMA frame can be measured at two different levels depending on whether the BTS supports dynamic power control or not.

Step 3

② The measurement can be performed as an overview measurement in the frequency range with spectrum display or as a zero span measurement and subsequent output of tabulated numerical results depending on the standard. In both cases a maximum offset frequency of ±1.8 MHz is used for the measurement.

③

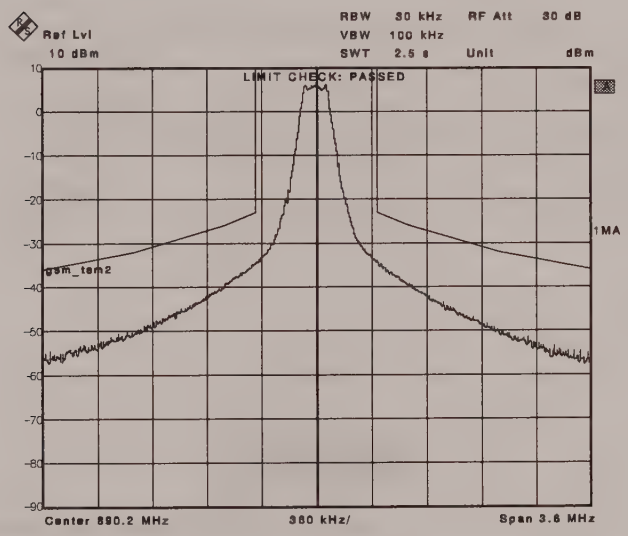


Fig. 1-7 Display of spectrum due to transients of a GSM base station (measurement in frequency range). Limit lines are inserted, the pass/fail info is displayed.

TRANS ENT SPECTRUM LIST

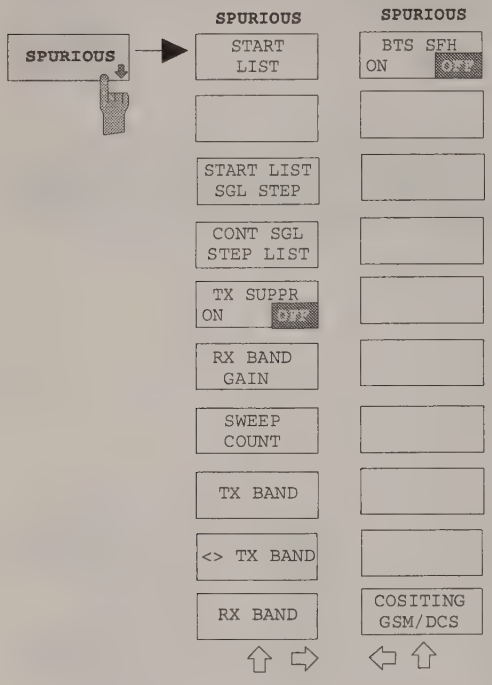
ARFCN:	699		Status: PASSED	
Frequency:	1.96760 GHz			
Carrier Power:	46.0 dBm		Ext. Att:	40.0 dB
Ref Pwr (RBW 300 kHz)	44.43 dBm		No. of Bursts:	1

No.:	Offset Freq.	+Offset	-Offset	Limit	Status
	400 kHz	-57.6 dB	-62.6 dB	-50.0 dB	PASSED
	600 kHz	-66.5 dB	-69.9 dB	-58.0 dB	PASSED
	1200 kHz	-74.3 dB	-73.8 dB	-66.0 dB	PASSED
	1800 kHz	-78.0 dB	-78.5 dB	-66.0 dB	PASSED

Fig. 1-8 Display of transient spectrum list (zero-span measurement). Results, limits and pass/fail information for the offset frequencies prescribed by the standards and a general pass/fail information are also displayed.

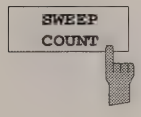
1.8 Measurement of Spurious ①

Note: *The test setup is described in section 1.1.*



Step 1

➢ Press softkey *SPURIOUS.*



Step 2

➢ Set the number of sweeps with softkey *SWEEP COUNT* for averaging in the RX band, or the number of sweeps for determining the peak values in the TX band.
Default setting: SWEEP COUNT = 1.

Press ◁ to return to the SETTINGS menu.

Additional information

① **BTS setting:**
The BTS is to be configured depending on the selected frequency band (TX, <>TX or RX band):

GSM900, DCS1800 phase 1:
TX band and <>TX band
If the BTS supports SFH (slow frequency hopping), SFH should be selected (change between B, M and T channel). Switch every second timeslot to full power.

RX band:
Switch all slots to full power.

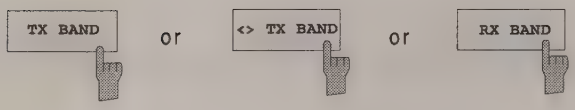
GSM900/DCS18000 phase 2:

The BTS is to be configured depending on the selected frequency band (TX, <>TX or RX band):

TX band:
Switch on a TRX with maximum power on all slots.
Switch off SFH.

<>TX band:
Switch every second timeslot to full power. If the BTS supports SFH, SFH should be selected.

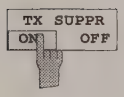
RX-Band:
Switch all timeslots of the BTS to full power. Switch off SFH (slow frequency hopping).



Step 3

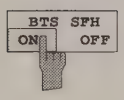
➢ Determine the measurement range with *TX BAND*, *<> TX BAND* (outside TX and RX Band) or *RX BAND*. The test setup has to be modified depending on the frequency band used (see section 1.1.3). ①

Measurement in <>TX Band:



➢ For BTSs with an output power of approx. > 35 dBm, the carrier signal(s) must be suppressed by at least 25 dB to give FSE sufficient sensitivity for a large measurement bandwidth (≥300 kHz) and also to prevent harmonics generated by FSE from being measured. The suppression can be performed using a bandstop filter or a highpass filter if harmonics are measured. In this case TX SUPPR ON has to be activated in addition. FSE then increases its sensitivity by 20 dB (reference level reduced by 20 dB).

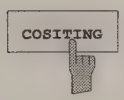
Step 4



or

➢ If the BTS is to be measured in the SFH mode (slow frequency hopping), switch *BTS SHF* to *ON*. (Condition: ARFCN = M channel). ②

Step 5



➢ If a cositing BTS is to be measured for GSM900/DCS1800 phase 2, activate the softkey *COSITING* ③

Additional information

Step 4

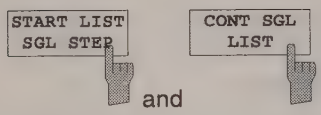
② The measurement time is extended as required (by the factor 3 compared to SFH OFF). For measurements in the TX band the B and T channels are skipped in addition to the ARFCN channel.

Step 5

③ A cositing BTS can send and receive in the GSM band and the DCS1800 band.

If measurements are performed in the RX band of the system used(defined under SETTINGS), the RX band of the other system is also measured.

Alternative:



Step 6

- If a complete measurement is to be performed in the selected TX, <>TX or RX band, press softkey *START LIST*.

  Alternative:

- For a ***step-by-step*** measurement of the individual frequency bands (TX and <> TX band), press softkeys START LIST SGL STEP and CONT SGL LIST:

After the measurement has been completed, a tabulated overview of results with limits and pass/fail information is displayed. ④

Additional information

Step 6

④

SPURIOUS LIST: TX Band

ARFCN:	699	Status:	PASSED
Frequency:	1.96760 GHz		
Carrier Power:	46.0 dBm	Ext. Att:	40.0 dB

No.	Frequency	Level	Limit	Status
	1.96150 GHz --- 1.96580 GHz	-40.3 dBm	-36 dBm	PASSED
	1.96940 GHz --- 1.97360 GHz	-39.7 dBm	-36 dBm	PASSED
	1.93000 GHz --- 1.96160 GHz	-37.9 dBm	-36 dBm	MARGIN
1	1.95514 GHz	-37.9 dBm	-36 dBm	MARGIN
2	1.94267 GHz	-38.0 dBm	-36 dBm	MARGIN
3	1.93418 GHz	-38.5 dBm	-36 dBm	MARGIN
4	1.93228 GHz	-38.8 dBm	-36 dBm	MARGIN
5	1.95425 GHz	-38.9 dBm	-36 dBm	MARGIN
	1.97350 GHz --- 1.99000 GHz	-37.0 dBm	-36 dBm	MARGIN
6	1.97551 GHz	-37.0 dBm	-36 dBm	MARGIN

Fig. 1-9 Example of a spurious list for the TX band (PCS1900 standard)

In addition to the general information at the top of the table including the general PASS/FAIL information, all frequency ranges, the maximum level measured in the range and the applicable range limit plus status information are listed.

A frequency range is defined by an identical RBW/VBW setting of the FSE and the same LIMIT.

If the margin or the limit of a frequency range is exceeded, spurious frequencies with levels are listed in addition (with numbers).

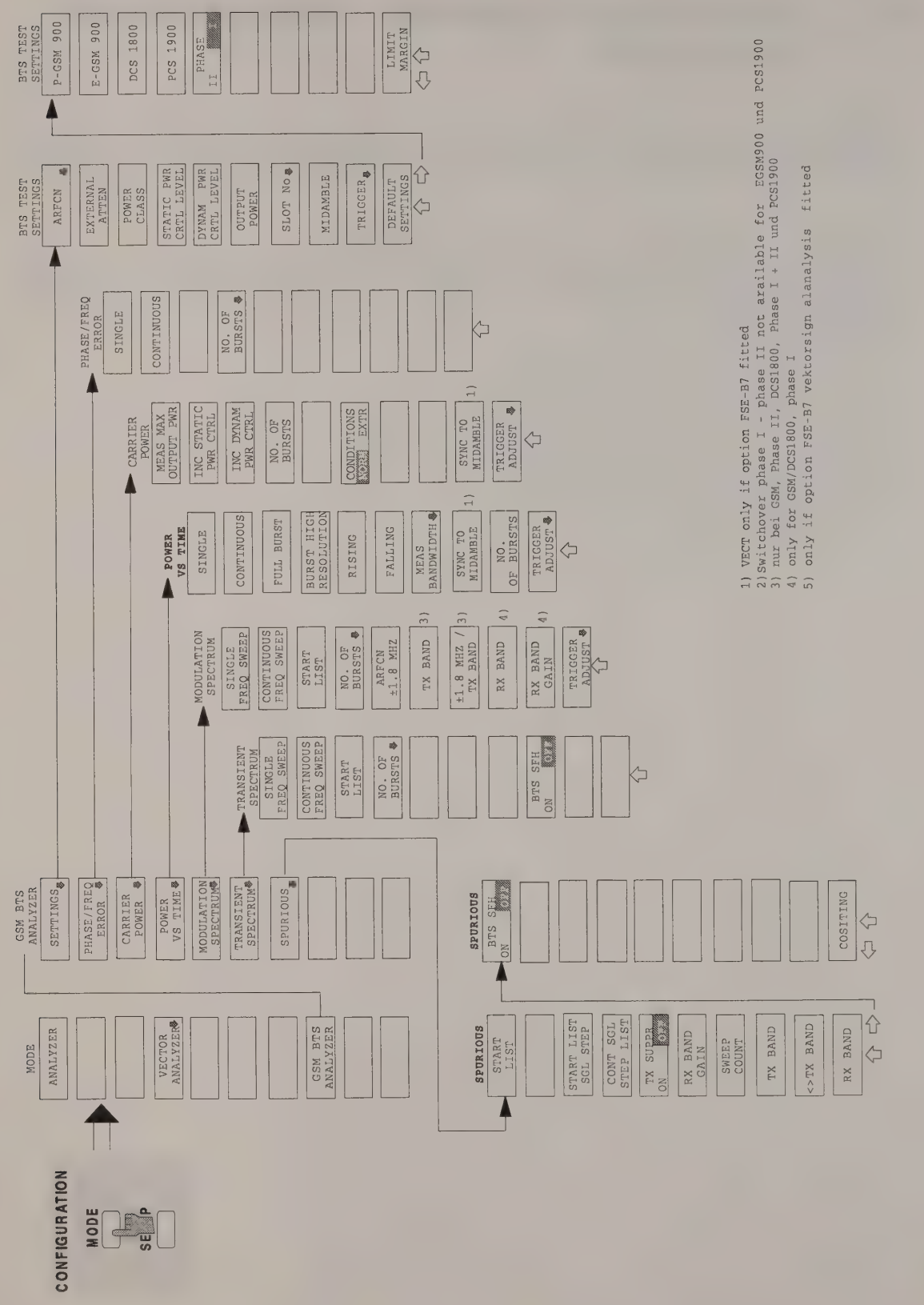
2 Menus of the Application - Softkey GSM BTS ANALYZER

The MODE key and the GSM BTS ANALYZER softkey activate the application GSM/DCS/PCS Base Station Tests. They open the menu for selecting the measurements according to the respective standards. The default settings are made in the submenu of the softkey *SETTINGS*.

The FSE then assumes the functions of a GSM base station tester.

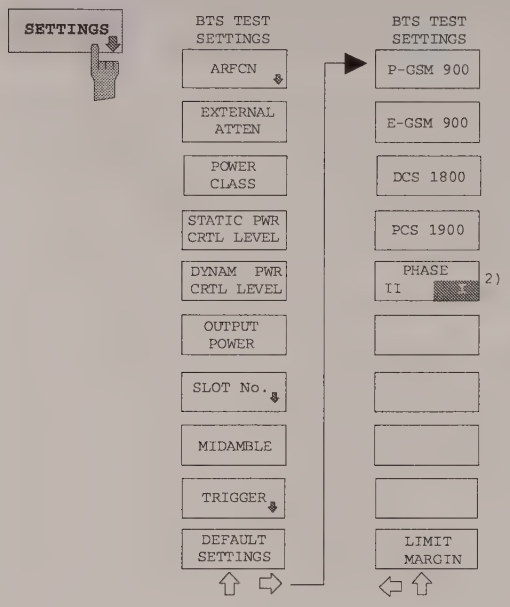
In this mode, according to the standards (GSM 11.20, GSM 11.20-DCS, GSM11.21 or J-STD-007 Air Interface), the following measurements can be carried out in a simple way at the GSM900, DCS1800 or PCS1900 base stations:

- measurement of phase and frequency error
- measurement of average power transmitted
- measurement of power ramp with the mask for the timing
- measurement of spectra "due to modulation
- measurement of spectra "due to transients"
- measurement of spurious


CONFIGURATION
MODE
SETUP
MODE
ANALYZER
VECTOR ANALYZER
GSM BTS ANALYZER
GSM BTS ANALYZER
SETTINGS
PHASE/FREQ ERROR
CARRIER POWER
POWER VS TIME
MODULATION SPECTRUM
TRANSIENT SPECTRUM
SPURIOUS
SPURIOUS
START LIST
START LIST SGL STEP
CONT SGL STEP LIST
TX SUPPR ON OFF
RX BAND GAIN
SWEEP COUNT
TX BAND
<>TX BAND
RX BAND
SPURIOUS
BTS SFH ON OFF
COSITING
TRANSIENT SPECTRUM
SINGLE FREQ SWEEP
CONTINUOUS FREQ SWEEP
START LIST
NO. OF BURSTS
BTS SFH ON OFF
MODULATION SPECTRUM
SINGLE FREQ SWEEP
CONTINUOUS FREQ SWEEP
START LIST
NO. OF BURSTS
ARFCN ±1.8 MHZ
TX BAND 3)
±1.8 MHZ / TX BAND 3)
RX BAND 4)
RX BAND GAIN 4)
TRIGGER ADJUST
POWER VS TIME
SINGLE
CONTINUOUS
FULL BURST
BURST HIGH RESOLUTION
RISING
FALLING
MEAS BANDWIDTH
SYNC TO MIDAMBLE 1)
NO. OF BURSTS
TRIGGER ADJUST
CARRIER POWER
MEAS MAX OUTPUT PWR
INC STATIC PWR CTRL
INC DYNAM PWR CTRL
NO. OF BURSTS
CONDITIONS FOR EXTR
SYNC TO MIDAMBLE 1)
TRIGGER ADJUST
PHASE/FREQ ERROR
SINGLE
CONTINUOUS
NO. OF BURSTS
BTS TEST SETTINGS
ARFCN
EXTERNAL ATTEN
POWER CLASS
STATIC PWR CRTL LEVEL
DYNAM PWR CRTL LEVEL
OUTPUT POWER
SLOT No.
MIDAMBLE
TRIGGER
DEFAULT SETTINGS
BTS TEST SETTINGS
P-GSM 900
E-GSM 900
DCS 1800
PCS 1900
PHASE II
LIMIT MARGIN
1) VECT only if option FSE-B7 fitted
2)Switchover phase I - phase II not available for EGSM900 und PCS1900
3) nur bei GSM, Phase II, DCS1800, Phase I + II und PCS1900
4) only for GSM/DCS1800, phase I
5) only if option FSE-B7 vektorsign alanalysis fitted

2.1 Selection of Default Settings

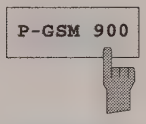
CONFIGURATION MODE - GSM BTS ANALYZER menu

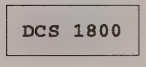


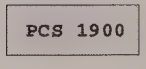
The SETTINGS softkey calls up the submenu for the default setting of the test parameters. The submenu with the associated secondary menu permits to select the transmission system. It is to be found in the secondary menu, since it will have to be switched only rarely. The parameters to be varied more often such as channel, external attenuation, power, midamble, burst type, etc. are to be found in the main part of the submenu so that they are easily accessible.

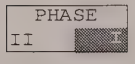
2.1.1 Selection of the Standard

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu









The P-*GSM 900, E-GSM 900, DCS 1800* and *PCS 1900* softkeys preset the standard to be used for the measurement.

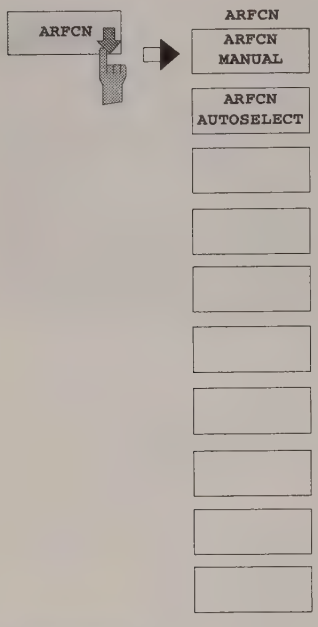
The four softkeys are mutually exclusive selection switches, only one can be active at any one time. If the standard is selected, the FSE uses the standard-specific settings and limit values for the measurement.

With the standards P-GSM-900 (phase 1) and DCS 1800 (phase 1) the measurement is made according to the ETSI standard ETS 300 607 (GSM 11.20 or GSM 11.20-DCS), with the standards P-GSM-900 (phase 2) and DCS 1800 (phase 2) as well as E-GSM 900 the measurement is made according to the ETSI standard ETS 300 609-1 (GSM 11.21), and with the standard PCS 1900 the measurement is made according to the American standard J-STD-007 Air Interface.

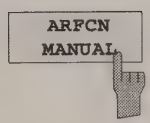
The *PHASE I/II* softkey switches the measurements between the two phases Phase I and Phase II in the case of P-GSM 900 and DCS 1800. All measurements and limit values are matched to the phase selected.
In the case of E-GSM and PCS 1900 the softkey is not available.

2.1.2 Setting of the Transmission Channel

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu



The *ARFCN* (Absolute Radio Frequency Channel Number) softkey calls a submenu for setting the channel for transmission from base station to mobile station.



Softkey *ARFCN MANUAL* sets the center frequency of the FSE to the selected channel frequency. Center frequencies that are different from the available channel frequencies can be set via the *FREQUENCY CENTER* menu by selecting physical frequencies.

The center frequencies are assigned to the channels as follows:

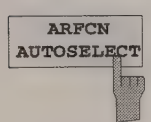
P-GSM f_{TX} = 935 MHz + ARFCN x 200 kHz
ARFCN = 1 to 124

E-GSM f_{TX} = 935 MHz + ARFCN x 200 kHz
$0 \leq$ ARFCN ≤ 124

f_{TX} = 935 MHz + (ARFCN-1024) x 200 kHz
$975 \leq$ ARFCN ≤ 1023

DCS 1800 f_{TX}=1805.2 MHz + (ARFCN - 512) x 200 kHz
ARFCN = 512 to 885

PCS 1900 f_{TX}=1930.2 MHz + (ARFCN - 512) x 200 kHz
ARFCN = 512 to 810

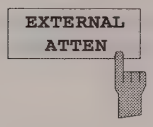


Softkey *ARFCN AUTOSELECT* automatically searches for the transmission channel and adjusts the center frequency to the channel of the carrier found. The search is performed in a sweep over the entire frequency range of the transmission band. The maximum level value in the transmission channel is searched for with the aid of the marker. The marker frequency is assigned to the respective channel.
The function is performed once after it has been called up.

2.1.3 Taking into Account External Attenuation or Gain

For measurements at the RF interface, RF cables, attenuator pads, power splitters, directional couplers, amplifiers or other devices are used to match the level of the RF signal or connect further test equipment. The attenuation from the RF interface of the transmitter to the RF input of the FSE can be corrected by a constant attenuation factor.

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu



The *EXTERNAL ATTEN* softkey opens up an input field for setting the correction for level display when using an external attenuator pad .

All measured levels and the inscription of the Y-axis of the chart are shifted by the selected correction value. The effect of the softkey is identical with the input of a level offset *(LEVEL REF LEVEL OFFSET)* using the *REF* key.

Default setting is 20 dB attenuation.

The necessary external attenuation depends on the maximum output power of the base station to be measured (and on the set static and dynamic power control level).
It is recommended to set the external attenuator depending only on the BTS maximum power level to avoid overloading of the FSE input also if the BTS is erroneously set.
The maximum input power of FSE shall never exceed +30 dBm. Firmware FSE-K11 supports FSE input powers of up to +27 dBm, where
FSE input power = maximum power of BTS - external attenuation.

The external attenuation must not be too high to avoid the S/N ratio of the FSE being affected (particularly at a BTS power reduced by static or dynamic power control).

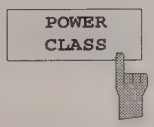
Recommended external attenuation with reference to the maximum base station output power:

Max. power	Recommended external attenuation
≥ 55 to 60 dBm -	35 to 40 dB
≥ 50 to 55 dBm	30 to 35 dB
≥ 45 to 50 dBm	25 to 30 dB
≥ 40 to 45 dBm	20 to 25 dB
≥ 35 to 40 dBm	15 to 20 dB
≥ 30 to 35 dBm	10 to 15 dB
≥ 25 to 30 dBm	5 to 10 dB
≥ 20 to 25 dBm	0 to 5 dB
< 20 dBm	0 dB

2.1.4 Setting the Nominal Transmission Power

The nominal transmission power is to be reported to the FSE so that it is able to select default settings correctly, e.g. input attenuation and limit lines. The power of the transmitter is determined by the power class of the base station and the Static or Dynamic Power Control Level.

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu



The *POWER CLASS* softkey opens a table for selecting the power class of the base station, i.e. the maximum power that can be transmitted by the base station. The standards specify eight classes (1 to 8) and three classes for Micro Base Transmitter Stations (M1 to M3).

The softkey *OUTPUT POWER* allows to enter the exact maximum power directly. In this case, the power class is assigned automatically according to the following tables.

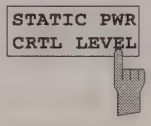
The following power classes are defined in the standards and are available:

Power Class	Maximum Peak Power P-GSM 900 - Phase 1	P-GSM 900 - Phase 2
1	320W (55 dBm)	320W (55 dBm)
2	160W (52 dBm)	160W (52 dBm)
3	80 W (49 dBm)	80 W (49 dBm)
4	40 W (46 dBm)	40 W (46 dBm)
5	20W (43 dBm)	20W (43 dBm)
6	10W (40 dBm)	10W (40 dBm)
7	5W (37 dBm)	5W (37 dBm)
8	2.5W (34 dBm)	2.5W (34 dBm)
M1	--	(>0.08) - 0.25 W (> 19) - 24 dBm
M2	--	(0.03) - 0.08 W (> 14) - 19 dBm
M3	--	(>0.01) - 0.03W (> 9) - 14 dBm

Power Class	Maximum Peak Power E-GSM 900 - Phase 2
1	320W (55 dBm)
2	160W (52 dBm)
3	80 W (49 dBm)
4	40 W (46 dBm)
5	20W (43 dBm)
6	10W (40 dBm)
7	5W (37 dBm)
8	2.5W (34 dBm)
M1	(>0.08) - 0.25 W (> 19) - 24 dBm
M2	(0.03) - 0.08 W (> 14) - 19 dBm
M3	(>0.01) - 0.03W (> 9) - 14 dBm

Power Class	Maximum Peak Power DCS1800 - Phase 1	DCS1800 - Phase 2
1	20 W (43 dBm)	20 - (<40W) 43 - < 46 dBm
2	10 W (40 dBm)	10 - (<20W) 40 - < 43 dBm
3	5 W (37 dBm)	5 - (< 10W) 37 - < 40 dBm
4	2.5 W (34 dBm)	2.5 -.(<5W) 34 - < 37 dBm
5	--	--
6	--	--
7	--	--
8	--	--
	--	
M1	--	(>0.5) - 1.6W (>27) - 32 dBm
M2	--	(>0.16) - 0.5W (>22) - 27 dBm
M3	--	(>0.05) - 0.16 W (>17) - 22 dBm

Power Class	Maximum Peak Power PCS1900 (Watt)	PCS1900 (dBm)
1	20≤P0≤40	43≤P0≤46
2	10≤P0≤20	40≤P0≤43
3	5≤P0≤10	37≤P0≤40
4	2≤P0≤5	33≤P0≤37
M1	0.5≤P0≤1.6	27≤P0≤32
M2	0.16≤P0≤0.5	22≤P0≤27
M3	0.05≤P0≤0.16	17≤P0≤22



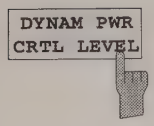
The *STATIC PWR CRTL LEVEL* softkey determines the current power of the base station which depends on the power class of the base station (relative to the maximum power).

The softkey opens an input window in which the output level is determined by numerical input of the digits 0 to 6. The 7 Static Power Control Levels are defined as follows:

Power Control Level	Relative power referred to maximum output power (GSM/DCS/PCS)
0 dB	0 dB
1 dB	-2 dB
2 dB	-4 dB
3 dB	-6 dB
4 dB	-8 dB
5 dB	-10 dB
6 dB	-12 dB

The maximum output power depends on the power class.
Default is Static Power Level 0 (maximum power).

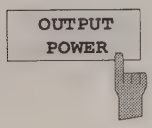
When an illegal power control level (> 6) is entered, the FSE displays the following message:
STATIC POWER CONTROL LEVEL NOT AVAILABLE!



The *DYNAM PWR CTRL LEVEL* softkey sets the FSE to the current power, taking into account the power class, static and dynamic power control levels:

In addition to the Static Power Control Level (0 to 6), a maximum of 16 Dynamic Power Control Levels are specified which lower the level of the base station relative to the maximum output power of the base station and the Static Power Control Level in up to 16 steps of 2 dB each (Dynamic Power Control Level N = 0 - 15, attenuation = N × 2 dB)

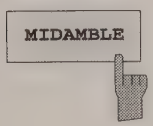
Default is Dynamic Power Control Level 0.



The *OUTPUT POWER* softkey directly sets the exact power level of the FSE to BTS level (the power class is then set automatically).
The static/dynamic power control levels are then set to 0. They can be varied again afterwards.

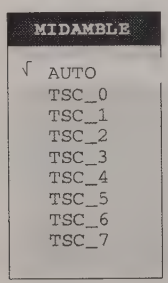
2.1.5 Selection of the Midamble

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu



The *MIDAMBLE* softkey specifies the midamble used by the base station. The midamble is only required for determining the time reference if the option Vector Signal Analysis FSE-B7 is installed. If the option is not installed, the softkey cannot be operated. The softkey opens a selection table in which all available midambles are offered for selection.

The software causes a table of all selectable midambles to be displayed.



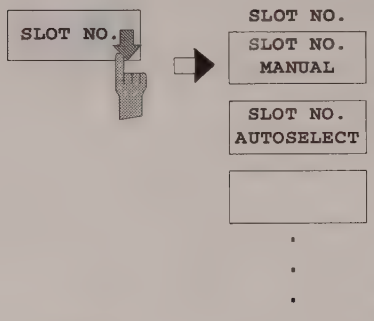
TSC_0 to TSC_7 (Training Sequence Code) represent the training sequences for the normal burst.

The desired midamble is selected by means of the cursor keys or the spinwheel and switched on using one of the unit keys. The selected midamble is marked by a hook.

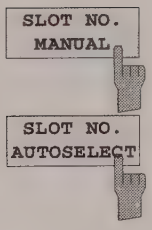
In position AUTO, FSE uses the training sequence that corresponds to the slot number, for instance TSC_2 for slot No. 2.

2.1.6 Selection of Slot Number

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu



The *SLOT NO.* softkey calls up a submenu for selection of the slot number.



The *SLOT NO MANUAL* softkey activates manual entry of the slot number (0 to 7)

Softkey *SLOT NO AUTO SELECT* searches once for the active slot. A precondition for an automatic search is that only one slot is active. For an automatic detection of the slot the frame trigger of the base station must be connected to the trigger input of the unit and the trigger source set to *EXTERN*.

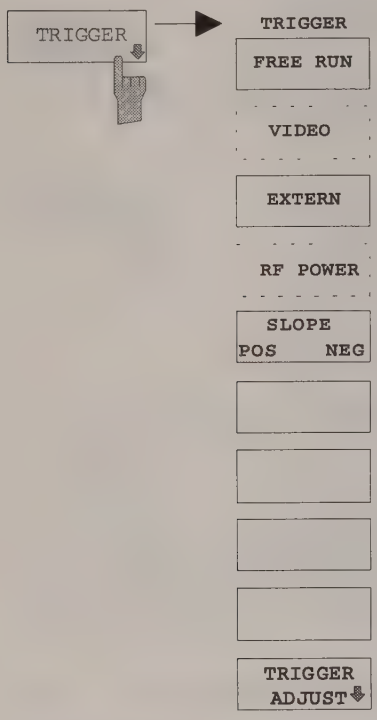
2.1.7 Setting of the Trigger

The measurements performed with the scalar trigger (i.e. triggering in analyzer mode) require an appropriate trigger so that the time reference between the TDMA burst and the measurement can be established. For this purpose, an external trigger signal (frame trigger) is usually required, which can be derived from the test item. For measurement of the carrier power and the burst power mask, the video trigger can also be used.
For the measurement of the carrier power, of the power vs. time and the phase/frequency error the exact time reference to the midamble can be established via *TRIGGER VECT* if the option FSE-B7, vector analysis, is fitted.
The following table shows the possible trigger modes for the different measurements:

Measurement	Trigger (scalar)	Trigger Source (Vector Analyzer Mode)
Carrier power	External	External + (midamble, burst)
Power vs. time	External	External or Free Run + (midamble, burst)
Phase/frequency error	--	External or Free Run + (midamble, burst)
Spectrum due to modulation	External / Free run*)	--
Spectrum due to switching	External / Free run	--
Spurious emissions	External **)/ Free run	--

*) In the case of free run the spectrum of test items can be measured with continuous modulation.
**) External trigger only for measurement in the RX-band (GSM900, phase I and DCS 1800, phase I)

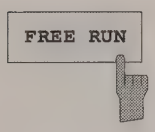
CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu



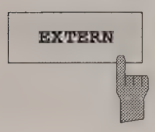
The *TRIGGER* softkey calls a submenu for the selection of the trigger source.

Default setting is *EXTERN*. This is suitable for all measurements

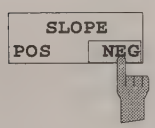
A different trigger source for the measurements is only possible if shown in the table.



The *FREE RUN* softkey activates the free-run mode.

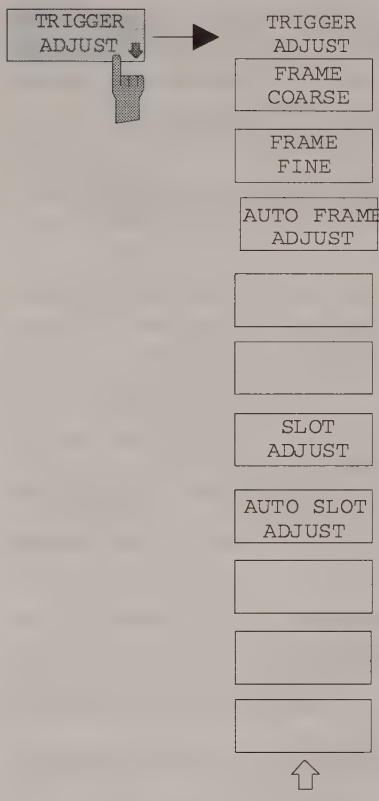


The *EXTERN* softkey activates triggering via an external trigger.



The *SLOPE POS/NEG* softkey selects the trigger slope.

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu

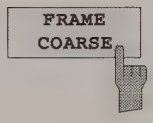


The *TRIGGER ADJUST* softkey calls a submenu in which the trigger can be adjusted.

This adjustment is necessary when option Vector Signal Analysis FSE-B7 is not fitted in order to establish a relation between the external trigger signal (in general the frame trigger) and the midamble of the measured burst. When option FSE-B7 is fitted, the exact relation to the midamble for measurement in the *VECTOR MODE* (phase and frequency error) is guaranteed.

Manual trigger adjustment can only be carried out in channels where the BTS bursts because it requires the edge of a burst to be present.

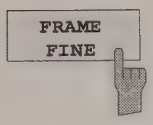
The FSE stores the trigger mode set when the menu is left and uses it for the respective measurements.



The *FRAME COARSE* softkey activates the coarse adjustment of the trigger. The FSE displays the burst with a sweep time of 5 ms in the time domain.

When using an external trigger, the trigger delay is to be varied such as to set the rising burst edge (-20 dB point) to the middle of the screen. The screen middle line and the -20 dB display line are for orientation.
The Up/Down keys each time shift the burst by one scaling (= 500 µs) to the right or left. Using the rotary knob the burst is shifted by 1/10 of the scaling (50 µs) at each detent position.

FRAME COARSE (same as *FRAME FINE*) changes the time reference between trigger and frame, ie for all slots.

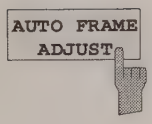


The *FRAME FINE* softkey activates the fine adjustment of the trigger.

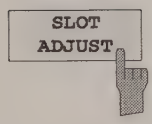
It shows the burst in a larger resolution by representing the burst edge with a sweep time of 100 µs. The rising burst edge is to be set to the middle of the screen again.

Using the Up/Down keys, the burst is shifted by one scaling (= 10 µs) to the right or left. Using the rotary knob, the burst is shifted by 1/10 of the scaling (= 1 µs) at each detent position.
The trigger is to be set such that the burst is on the middle vertical display line with a drop of about 20 dB. This establishes the relation between trigger time and midamble.

Note: *The adjustment with FRAME FINE or FRAME COARSE changes the time reference between trigger and frame, ie for all slots.*



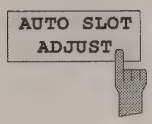
Softkey *AUTO FRAME ADJUST* performs an automatic trigger adjustment of the selected slot with reference to the bit transition 13/14 of the midamble, taking the I/Q demodulator (FSE-B7) into account.
Thus FSE can also be exactly triggered to the bit transition in the spectrum analyzer mode and with SYNC TO MIDAMBLE disabled.
The time reference of the frames, ie of all other slots is also adapted (contrary to *AUTO SLOT ADJUST*).



Softkey *SLOT ADJUST* permits the individual slots to be separately adjusted (after a frame adjustment has been performed once).
This is of particular importance if the BTS to be tested uses slots of different length (156 and 157 bits) as in this case only the slot used for the adjustment has to be adjusted after the frame adjustment.
The burst is displayed with a sweep time of 100 µs, the rising burst edge is to be set again to the screen center.

With the aid of the up/down keys the burst is shifted by half a scale (= 5 µs) to the right or left. The spinwheel moves the burst by 0.5 µs per step.
Adjust the trigger so that at a drop of 20 dB (= value of horizontal display line) the burst is as accurately as possible in the display center. Thus the reference between trigger time and midamble is established.

When the menu is quit, FSE stores the trigger settings and uses them for the corresponding measurements.

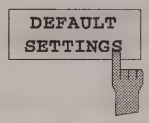


Softkey *AUTO SLOT ADJUST* initiates an automatic trigger adjustment of the selected slot with reference to the transition from bit 13 to 14 of the midamble, taking the I/Q demodulator (FSE-B7) into account.
Thus FSE can also be exactly triggered to the bit transition in the spectrum analyzer mode and with SYNC TO MIDAMBLE disabled.
The time reference of the frames, ie of all other slots, is **not** adapted.

2.1.8 Default Settings

In the various measurements, default settings are used for the test parameters such as resolution bandwidth, video bandwidth, etc. that are optimal for the respective measurement. If necessary, these settings can be varied. The default settings can be restored using the softkey *DEFAULT SETTINGS*.

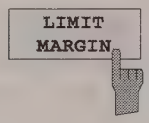
CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS menu



The *DEFAULT SETTINGS* softkey performs the different measurements with default settings according to the standard.

2.1.9 Setting the Limit Margin

CONFIGURATION MODE - GSM BTS ANALYZER - SETTINGS Menu



With the aid of softkey *LIMIT MARGIN* a limit margin can be defined for the subsequent measurements:

- Modulation spectrum
- Transient spectrum
- Spurious

The limit margin is to be entered in dB, the default setting is 1 dB.

The status PASSED is only signalled if the measured value is by more than the LIMIT MARGIN below the actual limit value.

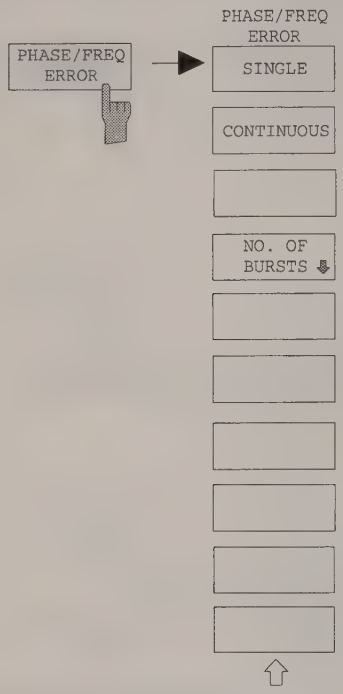
If the measured value is below the limit but within the limit margin, the status MARGIN is signalled and the respective value is listed (list mode).

If a LIMIT MARGIN should not be active, 0 dB is to be entered for the margin.

2.2 Measurement of Phase and Frequency Error

Note: *Measurement of phase error and frequency error can only be carried out, if the option FSE-B7 is installed. If the option FSE-B7 is not available, the softkey is not offered.*

CONFIGURATION MODE - GSM BTS ANALYZER menu



The *PHASE/FREQ ERROR* softkey calls a submenu for the configuration of the measurement of the phase and frequency error according to the selected standard.

After the measurement window A outputs the summary of the numerical modulation errors. To this end, the error calculation is performed over the 147 useful bits:

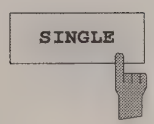
- max. hold value and average of peak values of the phase error
- max. hold value and average of RMS values of the phase error
- max. hold value and average of the frequency error

Measurement window B represents the phase error over the 147 useful bits of the normal burst as a function of time. Three traces are displayed:

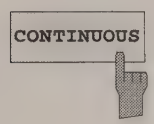
- trace No. 1: clear write
- trace No. 2: max. hold
- trace No. 3: min hold.

For synchronization, the midamble selected in the *SETTINGS* menu is used. For test items transmitting no midamble, the midamble is to be set to *NONE* in the SETTING menu. In this case, the FSE only triggers on the TDMA burst.

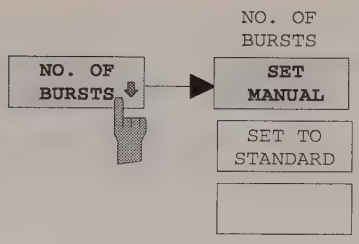
The measurement described so far requires only one slot of the base station to be active. If several slots are active the external (frame) trigger must be used (trigger EXTERN) and the slot number has to be specified in the SETTINGS menu.



The *SINGLE* softkey performs a single measurement over the entered number of bursts.



The *CONTINUOUS* softkey performs a continuous measurement until a different test function is called up.



Softkey *NO. OF BURSTS* calls up a submenu in which the number of bursts used for averaging the numeric result can be specified.

With SET MANUAL the desired number of bursts can be set. Default setting is 1 burst.

With *SET TO STANDARD* the number of bursts is set to the value prescribed for the selected standard.

For phase/frequency error measurements, 200 has to be entered for all standards.

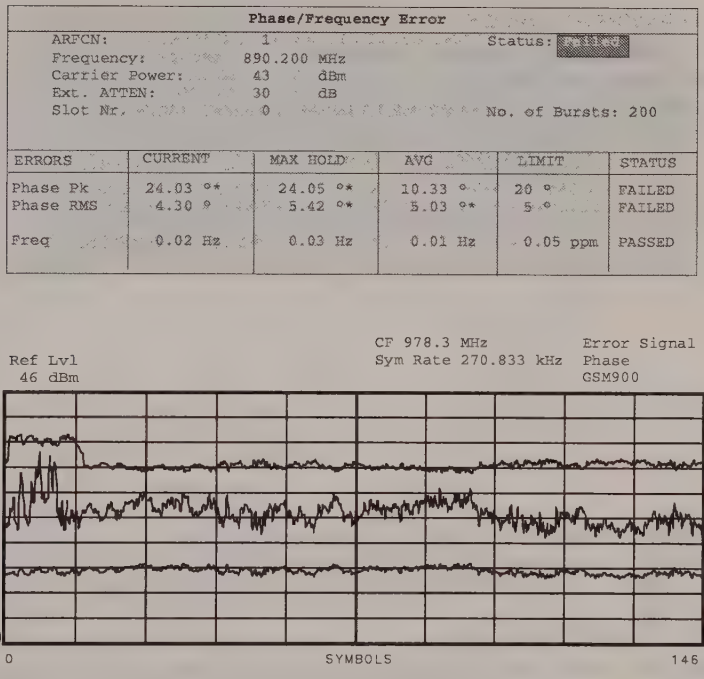
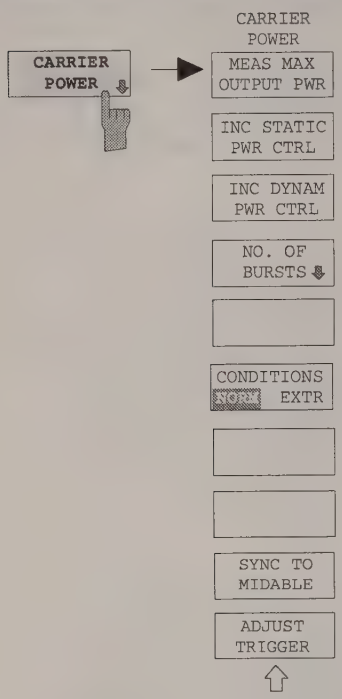

Phase/Frequency Error
A
ARFCN: 1
Status:
Frequency: 890.200 MHz
Carrier Power: 43 dBm
Ext. ATTEN: 30 dB
Slot Nr. 0
No. of Bursts: 200
ERRORS | CURRENT | MAX HOLD | AVG | LIMIT | STATUS
Phase Pk | 24.03 °* | 24.05 °* | 10.33 ° | 20 ° | FAILED
Phase RMS | 4.30 ° | 5.42 °* | 5.03 °* | 5 ° | FAILED
Freq | 0.02 Hz | 0.03 Hz | 0.01 Hz | 0.05 ppm | PASSED

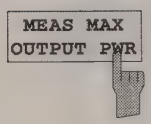
Fig. 2-1 Measurement of phase and frequency error

2.3 Measurement of Carrier Power

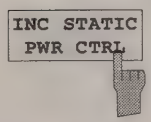
CONFIGURATION MODE - GSM BTS ANALYZER menu



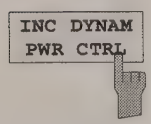
The *CARRIER POWER* softkey calls a submenu for setting the measurement of the average power of the signal during the burst.



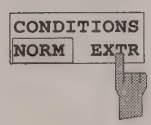
The *MEAS MAX OUTPUT PWR* softkey determines the reference level at Power Control Level 0 and checks the value



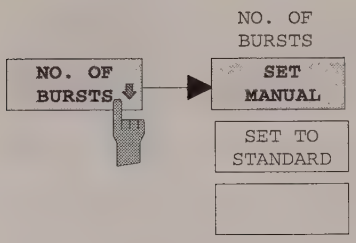
The *INC STATIC PWR CTRL* softkey increases the static dynamic Power Control Level and the checks the measured carrier power against the required limits.



The *INC DYNAM PWR CTRL* softkey increases the dynamic Power Control Level and the checks the measured carrier power against the required limits.



The *CONDITIONS NORM/EXTR* softkey defines on which conditions the Power Control Levels are checked. (normal or extreme)



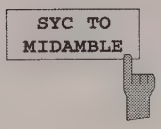
Softkey *NO. OF BURSTS* calls up a submenu in which the number of bursts used for averaging the carrier power can be specified.

With SET MANUAL the desired number of bursts can be set. The default setting is 1 burst.

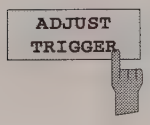
With *SET TO STANDARD* the number of bursts is set to the value prescribed by the selected standard

For power measurements this is:

- 1000 for GSM/DCS phase I and
- 200 for GSM/DCS phase II as well as PCS.



The *SYNC TO MIDAMBLE* softkey is not active. The time reference to the 147 useful bits must be established by a suitable trigger setting. The corresponding midamble can be selected in the BTS TEST SETTINGS-MIDAMBLE menu.



The *ADJUST TRIGGER* softkey opens a submenu to adjust the trigger settings.

Measurement procedure:

As a precondition for the measurement the settings must be adjusted to the base station to be tested.

1. Select the external trigger source (*TRIGGER - EXTERN*).
2. Adjust the trigger (*TRIGGER -ADJUST TRIGGER*).

   The standards require measurement of the carrier power at all static and dynamic power control levels. For the carrier power, absolute limits depending on the power control level must be checked as well as the question whether a tolerance is kept at each level step.
3. For this reason, the reference level at Power Control Level 0 is first determined using the *MEAS MAX OUTPUT PWR* and checked for its allowed tolerance with respect to the value defined via the *OUTPUT POWER* softkey in the *BTS TEST SETTINGS* menu.
4. Using softkeys *INC STATIC PWR CTRL* or *INC DYNAM PWR CTRL* the dynamic control level at each static power control level is incremented from 0 to 15 and the measured carrier power is checked with reference to set limit values.

   After this has been done at each static power control level, the display is switched from split-screen to full-screen display.

   The table can be scrolled using the up/down keys or the spinwheel.

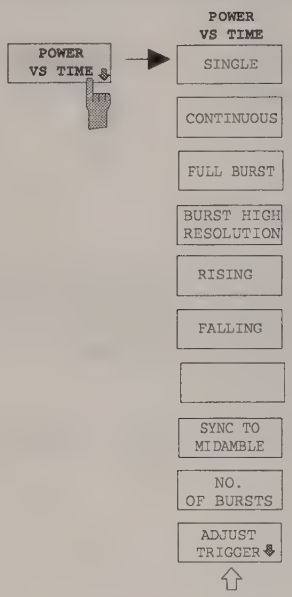
P-GSM 900 II CARRIER POWER

ARFCN:	1	Status:	PASSED
Frequency:	935.20000 MHz		
Carrier Power:	46.0 dBm	Conditions:	NORMAL
Ext Atten:	40.0 dB	No of Bursts:	1

PWR CTRL LEVEL Static	PWR CTRL LEVEL Dynamic	ABS PWR dBm	DELTA STEP dB	Status
0	0	45.89		PASSED
1	0	44.23	-1.66	PASSED
2	0	42.16	-2.07	PASSED
3	0	40.15	-2.01	PASSED
4	0	38.34	-1.81	PASSED
5	0	36.24	-2.10	PASSED
6	0	34.11	-2.13	PASSED

2.4 Measurement of Burst Timing

CONFIGURATION MODE - GSM BTS ANALYZER menu



The *POWER VS TIME* softkey displays the carrier power versus time with the respective limit lines.

There are always 3 traces displayed: Max Peak, Min Peak and Average; the limit violation check is performed on Max Peak and Min Peak. The FSE displays the masks defined in the standards in the chart. The mask used depends on the standard selected.

The softkey calls a submenu in which the specific default settings and the display mode are selected.

the time reference to the limit value mask is to be established by means of an appropriate trigger setting.
The exact level reference is established by referring to the average power during the useful part" of the burst. For this purpose, the FSE measures the average carrier power before it is displayed on the screen and uses it as reference.
The trigger setting can be adjusted in submenu *TRIGGER ADJUST*.

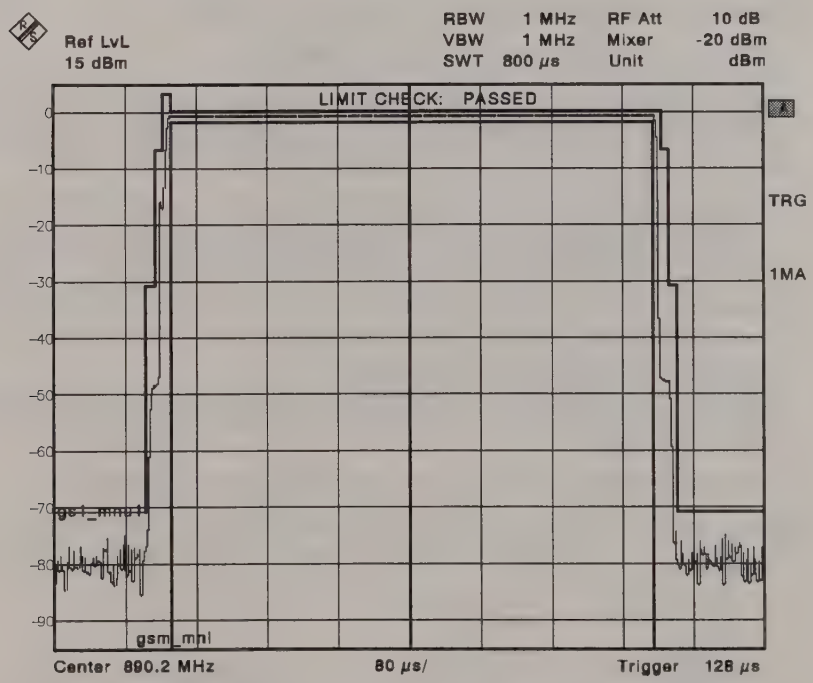
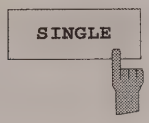
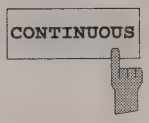


Fig. 2-2 Display of a burst (SLOT) at setting *FULL BURST*

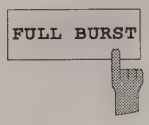


The *SINGLE* softkey calls up a single burst measurement (depending on NO. OF BURSTS).

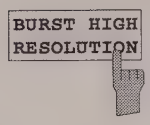


The *CONTINUOUS* softkey performs continuous measurements.

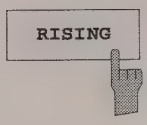
The following display modes are offered:



The *FULL BURST* softkey displays a complete TDMA burst with the associated limit values on the screen.

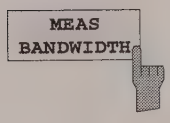


The *BURST HIGH RESOLUTION* softkey displays a complete TDMA burst with 1 dB vertical resolution, as well as the limit lines for the 147 useful bits.

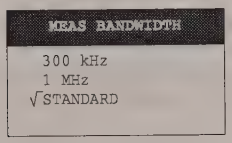


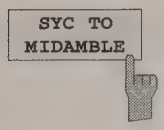
The *RISING* softkey displays the rising edge of a burst. The limit lines for the rising edge are displayed in addition.

The *FALLING* softkey displays the falling edge of a burst. The limit limes for the falling edge are displayed in addition.



MEAS BANDWIDTH calls up a table where the desired measurement bandwidth (300 kHz or 1 MHz) can be selected.
When a standard is selected, the measurement bandwidth is automatically set depending on the standard and the selected measurement.
(eg for GSM, phase I, RISING and FALLING: 300 kHz,
HIGH RESOLUTION: 1 MHz).



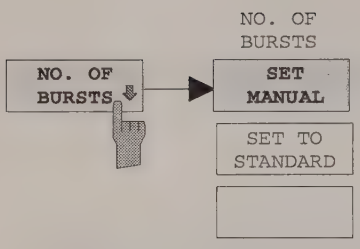


Only with option Vector Signal Analysis FSE-B7:

The softkey *SYNC TO MIDAMBLE* is activated in default setting so that synchronization acts on the midamble of the burst. This enables the burst to be represented with great time accuracy for limit lines. The corresponding midamble can be selected in the *BTS TEST SETTINGS-MIDAMBLE* menu.

The time reference to the 147 useful bits must be established by a suitable trigger setting.

If option FSE-B7 is not installed, the softkey is deactivated and cannot be operated.



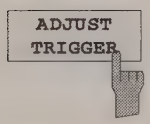
Softkey *NO. OF BURSTS* calls up a submenu where the number of the bursts used in the SINGLE mode can be specified.

With SET MANUAL the desired number of bursts can be set. Default setting: 1 burst

With *SET TO STANDARD* the number of bursts is set to the value prescribed by the selected standard.

For power ramp measurements this is:

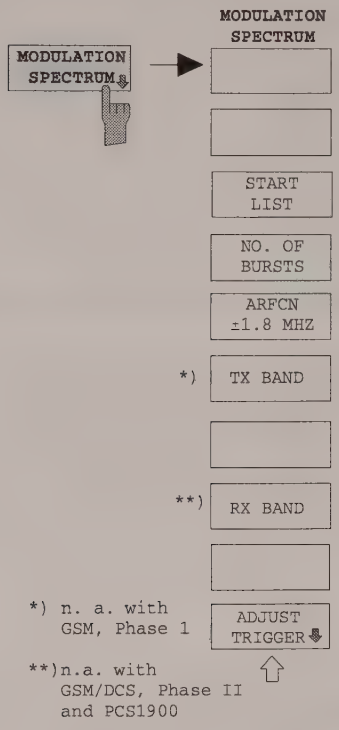
100 for all standards.



The *ADJUST* TRIGGER softkey calls up a submenu for adjustment of the trigger.

2.5 Measurement of Spectrum due to Modulation

CONFIGURATION MODE - GSM BTS ANALYZER menu



The MODULATION *SPECTRUM* softkey calls the submenu for measurement of the modulation spectrum of the bursted signal.

FSE is operated in the analyzer mode with external triggering.

The softkey *SINGLE FREQ SWEEP* triggers a single spectrum measurement, with *CONTINUOUS FREQ SWEEP* continuous measurements are performed. In both cases the spectrum is displayed in the form of a trace with suitable limit values for the base station output level.

Measurements triggered with softkeys *SINGLE FREQ SWEEP* and *CONTINUOUS FREQ SWEEP* are performed in spectral range.

The *START LIST* softkey starts the measurement at discrete frequency offsets (*LIST*).

The measurement is performed according to the selection *ARFCN ±1.8 MHz*, *TX BAND* or *RX BAND* in zero span mode or spectral display mode with the frequency steps defined in the standards and the associated bandwidth settings.

An external trigger signal is used which triggers the measurement on 50 % to 90 % of the useful part of the burst (with the midamble excluded).

The measurement results are output in two windows. The lower window shows the level characteristic as a trace with the respective frequency offset (or as a frequency sweep in the respective frequency range), the upper window outputs the measurement results in the form of a list.
After the measurement is terminated the complete list is displayed in a window:

MODULATION SPECTRUM LIST: ARFCN ±1.8 MHz

ARFCN:	512	Status:	FAILED
Frequency:	1.93020 GHz		
Carrier Power:	46.0 dBm	Ext. Att/Gain:	40.0 dB
Ref Pwr (RBW 30 kHz)	45.22 dBm	No. of Bursts:	1

No.:	Offset Freq.	+Offset	-Offset	Limit	Status
	100 kHz	-35.5 dB	-36.8 dB	0.5 dB	PASSED
	200 kHz	-44.8 dB	-42.3 dB	-30.0 dB	PASSED
	250 kHz	-50.6 dB	-50.3 dB	-33.0 dB	PASSED
	400 kHz	-64.8 dB	-66.9 dB	-60.0 dB	PASSED
1	600 kHz	-23.5 dBm*	-21.9 dBm*	-70.0 dB	>FAILED<
2	800 kHz	-73.8 dB	-71.5 dB *	-70.0 dB	MARGIN
3	1000 kHz	-74.1 dB	-72.5 dB *	-70.0 dB	MARGIN
4	1200 kHz	-77.3 dB	-75.6 dB *	-73.0 dB	MARGIN
5	1400 kHz	-74.6 dB *	-74.8 dB *	-73.0 dB	MARGIN
6	1600 kHz	-76.9 dB	-74.8 dB *	-73.0 dB	MARGIN
7	1800 kHz	-75.3 dB *	-77.0 dB *	-75.0 dB	MARGIN

Fig. 2-3 Tabular output of the modulation spectrum in the band ARFCN ±1.8 MHz

If the measured values lie within the limits the frequency points are characterized by the "PASSED" status. Frequency points where the limit check yields FAILED or MARGIN are characterized by current numbers in the No. column.
Measured values that violate the limit or the margin are characterized by an asterisk "*". Measured values that exceed the limit are output as absolute levels in units of dBm.

The FSE performs the following sequence:

With setting ARFCN ± 1.8 MHz:

The FSE measures the average power of the modulation spectrum at the channel frequency in zero span mode. The power is averaged over n TDMA bursts (n= No. of Bursts). If the measurement is to be performed for 200 bursts as specified in the standard, the No. of bursts is to be set to 200. The measured value for the power is used as reference value for the following adjacent-channel power measurements.
Subsequently, the power is determined at the frequency offsets specified in the standards in the same way as with the measurement at the channel frequency and compared with the limit values.

With setting TX BAND
(= frequency offsets > 1.8 MHz off ARFCN)***:***

At the channel frequency in zero span mode, the FSE measures the power of the modulation spectrum averaged over n TDMA bursts (n= No. of bursts). This serves as a reference value for the subsequent measurements.

In spectral display mode the FSE sweeps (gating on) from
Lower limit of transmission band (possibly -2 MHz) to ARFCN -1.8 MHz
and from
ARFCN + 1.8 MHz to upper limit of transmission band (possibly + 2 MHz)

Example: PCS1900:
1928 MHz to- (ARFCN - 1.8 MHz)
and:
ARFCN + 1.8 MHz to 1992 MHz.

Subsequently, the measured values are compared with the limit values.

With setting RX *BAND* (only for GSM900/DCS1800 phase 1)**:**

The FSE measures the average power of the modulation spectrum within the whole RX frequency range and in steps of 200 kHz. The power is averaged over n TDMA bursts (n= no. of bursts).

Subsequently, the measured values are compared with the limit values.

The SINGLE FREQ SWEEP or CONT FREQ SWEEP softkey performs the measurement of the modulation spectrum as an overview measurement in the spectral range. FSE sweeps only 50 to 90% of the bursts, the midamble time being excluded (gated sweep).

To determine the reference power for the limit lines a time-domain measurement at the carrier frequency is carried out beforehand.

SINGLE FREQ SWEEP starts one sweep,

CONT FREQ SWEEP performs continuous sweeps.

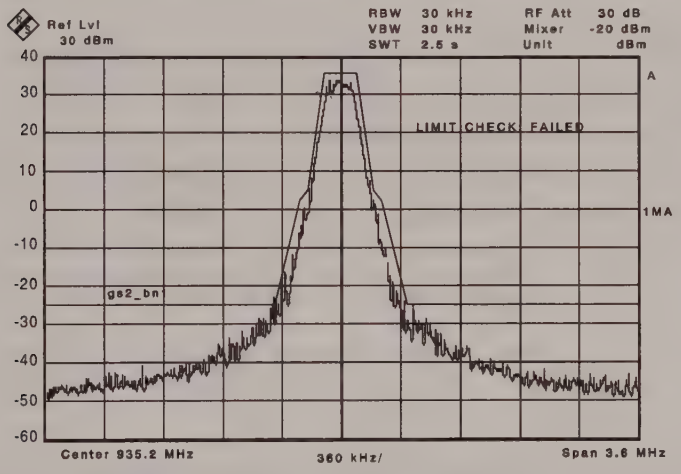


Fig. 2-4 Measurement of the modulation spectrum in the range ±1.8 MHz about the carrier frequency (spectrum measurement)

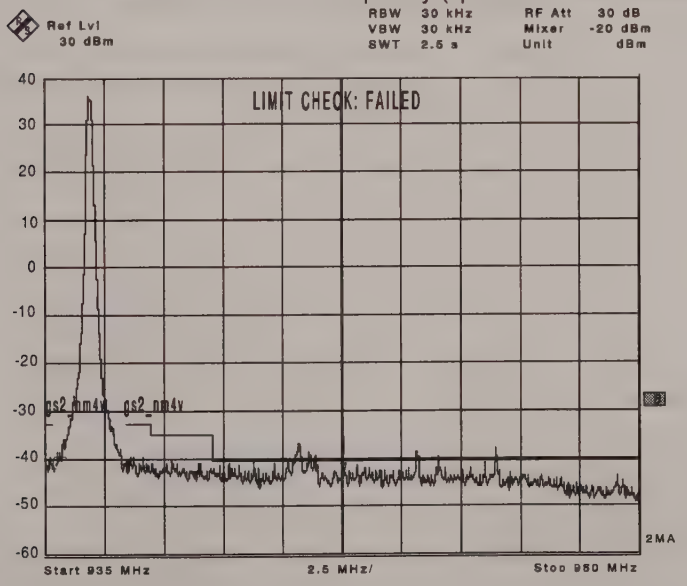
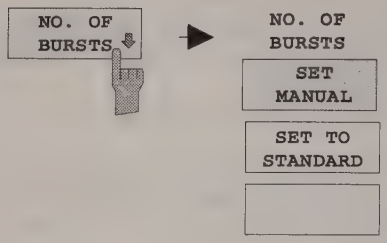


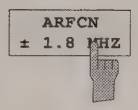
Fig. 2-5 Measurement of the modulation spectrum in the TX band region of the spectrum.



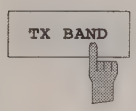
The softkey *NO. OF BURSTS* calls up a menu where the number of bursts to be used with the setting SINGLE can be specified.

SET MANUAL allows the user to set the desired number of bursts.Default setting: 1 burst.

SET TO STANDARD sets the number of bursts to the value prescribed by the standard selected.

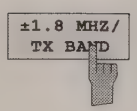


The *ARFCN ±1.8 MHz* softkey measures the modulation spectrum in the range ±1.8 MHz about the set channel.



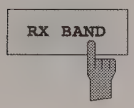
With DCS1800 phase I the *TX BAND* softkey measures the modulation spectrum in the complete transmission band except for range ARFCN ± 1.8 MHz.
In the case of GSM900 phase II, DCS1800 phase II and PCS1900 the FSE measures 2 MHz beyond the frequency limits of the transmission band. The test bandwidth is up to ±1.8 MHz about the channel frequency 30 kHz, 100 kHz for the larger frequency offsets.
In the case of GSM900 phase I the measurement of the modulation spectrum is not specified for the complete transmission band. The softkey is deactivated for this standard.

Note: *The measurement TX band is only available with GSM900 phase II, DCS1800 phases I and II as well as PCS1900 (not with GSM900, phase I).*



In the case of START LIST, the measurement started with softkey *±1.8 MHz /TX BAND* in the range ±1.8 MHz is performed in the time domain according to standards and in the frequency domain in the remaining TX band.

Note: *The measurement can only be performed for GSM900 phase II, DCS1800 phases I and II as well as PCS1900 (not for GSM900 phase I).*



The *RX BAND* softkey *(GSM 900 phase 1 and DCS 1800 phase 1)* measures the modulation spectrum in the receive band of the base station.
In the LIST mode, the RX band measurement in the modulation spectrum mode corresponds to the spurious measurement in the RX band as defined by 11.20 and 11.20-DCS. The spectrum is measured in the time or frequency domain according to the standards.

Because of the stringent requirements for spurious measurement in the RX band BTSs using a combined RX input/TX output demand adequate suppression of the carrier signal(s) (max. carrier level <-10 dBm at the FSE input), eg with the aid of bandstop filters or diplexers.

With BTSs using a ***separate*** RX input, the TX channel is always sufficiently suppressed at the RX input. If RX BAND is set, the FSE is switched to 0 dB attenuation in order to achieve maximum sensitivity. The *RX BAND GAIN* softkey allows to define the amplification of an external preamplifier used for the FSE display.

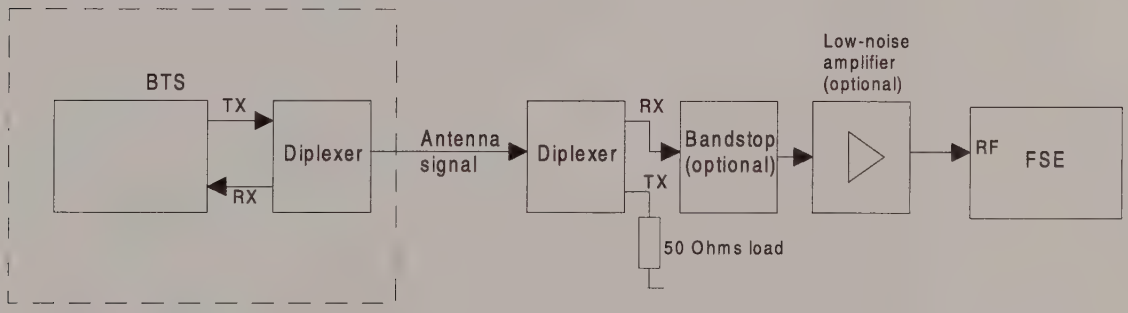
The attenuation of an external attenuator entered under "Setting" is ignored for the measurement of the RX band.

Caution: *Under no circumstances may the level of + 20 dBm at 0 dB attenuation of the entry attenuator be exceeded.*

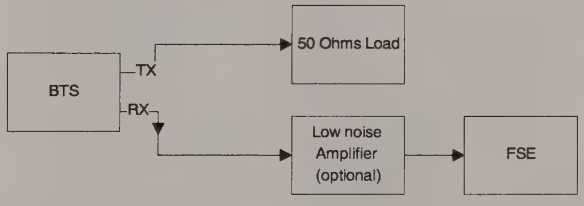
A respective warning is displayed upon pressing the RX BAND softkey:

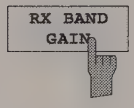
Caution: ***Connect bandpass or bandstop to suppress TX band!***

Test setup for BTSs with combined RX/TX input/output:

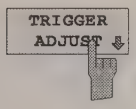


Test setup for BTSs with separate RX input and TX output:





The *RX BAND GAIN* softkey defines the amplification of the external preamplifier used for the FSE display.
If a negative value is entered, the entry is considered as the attenuation for the FSE display (eg attenuation of a bandstop filter).



The TRIGGER ADJUST softkey calls up a submenu for adjustment of the trigger

The test routine runs as follows in the spectrum display mode (SINGLE FREQ SWEEP or CONTINUOUS FREQ SWEEP):

FSE measures the average power at the channel frequency and the reference power over 10 bursts for a 30 kHz bandwidth. (The limit line is selected depending on the average power).

The reference level is also set by means of the measured average power.

- In the gated sweep mode FSE sweeps n times (n = No. of bursts) over the set frequency range, the trace being averaged.
- It then sets the marker to the channel frequency and measures the reference value for the limit line.
- The limit line is then adapted to the reference value, ie it is shifted to the reference value.

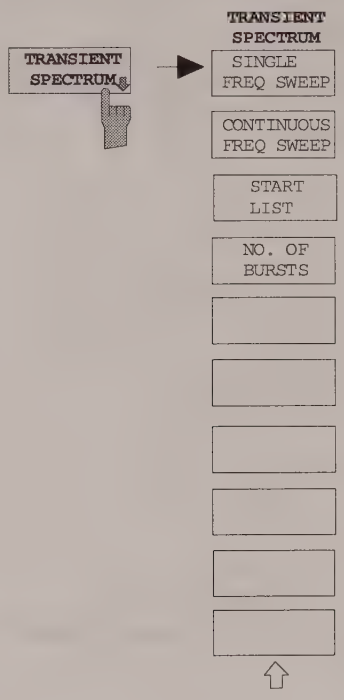
  (Y-OFFSET = REF LVL - MKR LEVEL)
- If the limit line is exceeded, the message LIMIT CHECK: FAIL is displayed on the FSE, otherwise LIMIT CHECK: PASSED.

With SINGLE FREQ SWEEP the measurement is stopped after one sweep and it is restarted when the function is called up again. With CONTINUOUS FREQ SWEEP the measurement restarts automatically.
Activating again CONTINUOUS FREQ SWEEP updates the reference value.

2.6 Measurement of the Transient Spectrum

The Transient Spectrum is defined as the spectrum produced by modulation of the carrier and by the switching operations due to the bursted signal.

CONFIGURATION MODE - GSM BTS ANALYZER menu

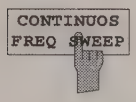


The *TRANSIENT SPECTRUM* softkey calls a submenu for settings of the measurement of the transient spectrum.

The transient spectrum is displayed as a spectral diagram with the respective limit lines or in tabular form. The limit lines are dependent on the set power level.

The measurement is performed using the peak-value detector and Peak Hold in order to measure the peaks produced by the switching operations. The measurement result results from the modulation spectrum and the spectrum due to switching operations of the TDMA burst.

The *SINGLE FREQ SWEEP* softkey triggers a single measurement with peak hold in the frequency range ±1.8 MHz about the set channel (ARFCN). The sweep time is selected such that each pixel of a sweep contains at least one burst.



The *CONTINUOUS FREQ SWEEP* softkey triggers a continuous measurement, ie the trace is updated with each new sweep. The peak detector is used for the measurements. Here, the entry of *NO. OF BURSTS* affects the sweep time which is set so that each pixel contains the given number of bursts.

When the transient spectrum is displayed, the limit values relative to the set power levels are also displayed.

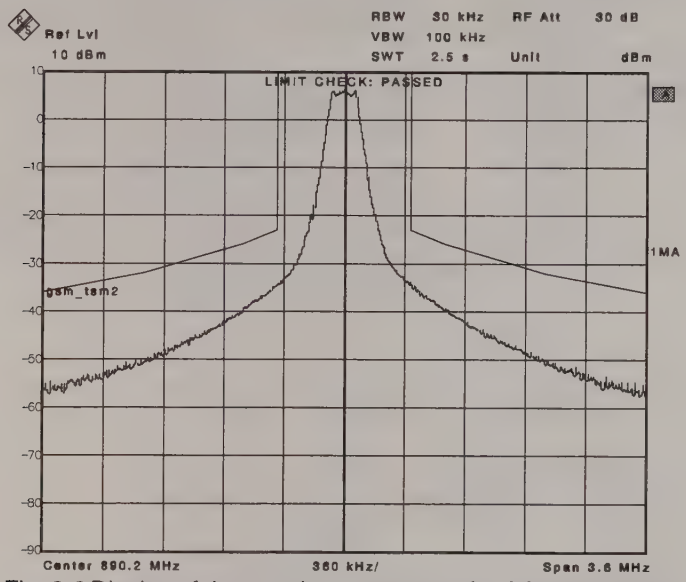
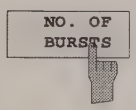
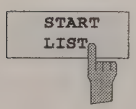


Fig. 2-6 Display of the transient spectrum of a GSM base station



The *NO. OF BURSTS* softkey determines the number of sweeps, the peak values from the individual sweeps being output.



The *START LIST* softkey measures the transient spectrum at the carrier offsets ±400 kHz, ±600 kHz, ±1200 kHz and ±1800 kHz and represents the results in a table with the corresponding limit values.

The adjacent channel power is measured in zero span mode at the offsets from the selected channel frequency indicated above.
The screen shows a numerical display of the preset carrier power and the powers at the different carrier offsets.

An external trigger signal is used for triggering.

Output of transient spectrum in tabular form:

TRANSIENT SPECTRUM LIST

ARFCN:	699		Status: PASSED		
Frequency:	1.96760 GHz				
Carrier Power:	46.0 dBm		Ext. Att:	40.0 dB	
Ref Pwr (RBW 300 kHz)	44.43 dBm		No. of Bursts:	1	

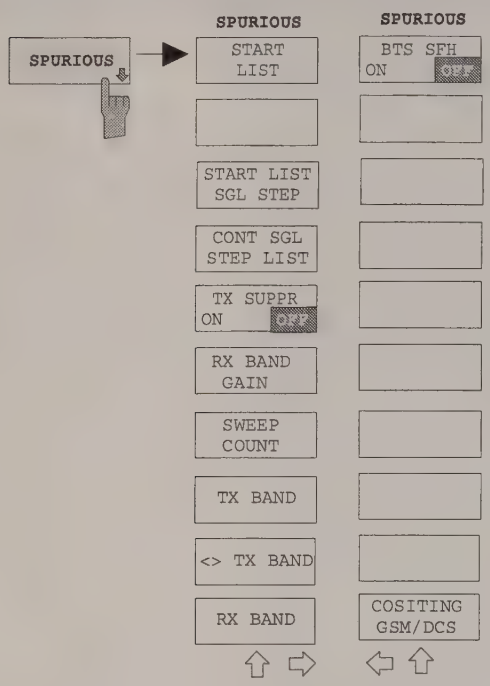
No.:	Offset Freq.	+Offset	-Offset	Limit	Status
	400 kHz	-57.6 dB	-62.6 dB	-50.0 dB	PASSED
	600 kHz	-66.5 dB	-69.9 dB	-58.0 dB	PASSED
	1200 kHz	-74.3 dB	-73.8 dB	-66.0 dB	PASSED
	1800 kHz	-78.0 dB	-78.5 dB	-66.0 dB	PASSED

Fig. 2-7 Output of the Transient Spectrum List

The limit values indicated in the LIMIT column of the table are obtained from the limit line derived from the selected power level. If a limit value is exceeded, it is marked by FAILED, otherwise by Passed. The exceeding measured value is marked by a an asterisk.
Measured values exceeding the relative limit are displayed as absolute levels in units of dBm.

2.7 Measurement of Spurious Emissions

CONFIGURATION MODE - GSM BTS ANALYZER menu



The *SPURIOUS* softkey measures the spurious emissions of the base station. It opens a submenu for setting the measurement.

Various frequency ranges with different bandwidth settings are specified in the standards.

The *TX BAND*, *<>TX BAND* and *RECEIVE BAND* softkeys specify the frequency range of the measurement.

The value for *EXTERNAL ATTEN* (attenuation of the carrier power) entered in the *BTS TEST SETTINGS* menu is taken into account in all bands for the display of measured values.

The *START LIST* softkey measures in a single sequence in the different frequency bands with the specified bandwidths.

It automatically switches to SPLIT SCREEN mode. The upper window displays the list of spurious and the lower window the spectrum of the actual sweep. All levels that are less than 3 dB below the limit value are output in a list.
If they don't exceed the limit value, they are marked with "MARGIN", and if they exceed the limit value they are marked with "FAILED".

A new measurement can be started with softkey *START LIST*

After the end of a measurement the FSE switches to full screen mode. The window displays the list of spurious.

Output of the spurious list:

TX Band:

SPURIOUS LIST: TX Band

ARFCN: 699 Status: PASSED
Frequency: 1.96760 GHz
Carrier Power: 46.0 dBm Ext. Att: 40.0 dB

No.	Frequency	Level	Limit	Status
	1.96160 GHz --- 1.96580 GHz	-40.3 dBm	-36 dBm	PASSED
	1.96940 GHz --- 1.97360 GHz	-39.7 dBm	-36 dBm	PASSED
	1.93000 GHz --- 1.96160 GHz	-37.9 dBm	-36 dBm	MARGIN
1	1.95514 GHz	-37.9 dBm	-36 dBm	MARGIN
2	1.94267 GHz	-38.0 dBm	-36 dBm	MARGIN
3	1.93418 GHz	-38.5 dBm	-36 dBm	MARGIN
4	1.93228 GHz	-38.8 dBm	-36 dBm	MARGIN
5	1.95425 GHz	-38.9 dBm	-36 dBm	MARGIN
	1.97360 GHz --- 1.99000 GHz	-37.0 dBm	-36 dBm	MARGIN
6	1.97551 GHz	-37.0 dBm	-36 dBm	MARGIN

Fig. 2-8 Output of the spurious list in the TX band (PCS1900 standard)

The upper part of the list shows the current TX-channel (ARFCN), the carrier power, the currently measured band and the status of the total measurement (PASSED/FAILED/ ABORTED/ BLANK)

For each frequency domain measured a summary information containing the frequency limits, the maximum level measured and the summarized result of the limit check. If spurious emissions are measured inside a frequency domain, they are listed as single frequencies in extra lines below.
The limit values indicated in the LIMIT column of the table are obtained from the limit line derived from the selected power level. If a limit value is exceeded, it is marked by FAILED, otherwise by PASSED. If the measured value comes closer than 3 dB to the limit value MARGIN is displayed.

<> TX band:

SPURIOUS LIST: <>TX Band

ARFCN: 699 Status: FAILED
Frequency: 1.96760 GHz
Carrier Power: 46.0 dBm Ext. Att: 40.0 dB

No.	Frequency	Level	Limit	Status
	100.00000 kHz --- 50.00000 MHz	-22.2 dBm	-36 dBm	>FAILED<
1	100.00000 kHz	-22.2 dBm	-36 dBm	>FAILED<
	50.00000 MHz --- 500.00000 MHz	-51.3 dBm	-36 dBm	PASSED
	500.00000 MHz --- 1.00000 GHz	-51.3 dBm	-36 dBm	PASSED
	1.00000 GHz --- 1.85000 GHz	-50.0 dBm	-30 dBm	PASSED
	1.91000 GHz --- 1.92000 GHz	-57.0 dBm	-30 dBm	PASSED
	1.92000 GHz --- 1.92500 GHz	-61.3 dBm	-30 dBm	PASSED
	1.92500 GHz --- 1.92800 GHz	-67.0 dBm	-30 dBm	PASSED
	1.99200 GHz --- 1.99500 GHz	-68.3 dBm	-30 dBm	PASSED
	1.99500 GHz --- 2.00000 GHz	-60.4 dBm	-30 dBm	PASSED
	2.00000 GHz --- 2.01000 GHz	-57.1 dBm	-30 dBm	PASSED
	2.01000 GHz --- 2.02000 GHz	-51.7 dBm	-30 dBm	PASSED
	2.02000 GHz --- 7.00000 GHz	-27.5 dBm	-30 dBm	>FAILED<
2	3.93615 GHz	-27.5 dBm	-30 dBm	>FAILED<

Fig. 2-9 Output of the spurious list outside the TX band (PCS1900 standard).

RX band:

SPURIOUS LIST: RX Band

ARFCN:	699		Status:	FAILED	
Frequency:	1.96760 GHz				
Carrier Power:	46.0	dBm	Ext. Att:	40.0 dB	

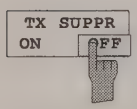
No.	Frequency	Level	Limit	Status
	1.85000 GHz --- 1.91000 GHz	-95.9 dBm	-98 dBm	>FAILED<
1	1.86046 GHz	-95.9 dBm	-98 dBm	>FAILED<

Fig. 2-10 Output of the spurious list in the RX band (PCS1900 standard).

The *START LIST SGL STEP* softkey starts the step-by-step measurement of the various frequency bands.

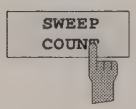
The single step mode is useful, e. g. for creating detailed documentation.

The *CONT SGL STEP LIST* softkey switches to the next frequency band.

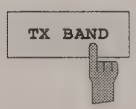


The *TX SUPPR ON/OFF* softkey selects a more sensitive setting (ON) of the device if the carrier in the selected band is sufficiently suppressed. In this case the reference level for the measurement is lowered by 20 dB.

The *RX BAND GAIN* softkey takes into account an eventually present low-noise preamplifier for the RX band when the measured values are displayed.



The *SWEEP COUNT* softkey defines the number of sweeps over which the averaging in the RX band takes place, or the number of sweeps used to obtain the peak values in the TX Band, respectively.

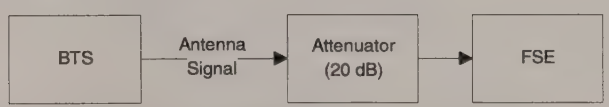


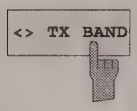
The *TX BAND* softkey measures the spurious emissions in the transmission band of the base station.

In general the TX band can be measured with the FSE alone without additional equipment (except for BTS with very large power > about 46 dBm).

For BTS > ca. 46 dBm the test setup for <> TX band is necessary.

Test setup TX band:



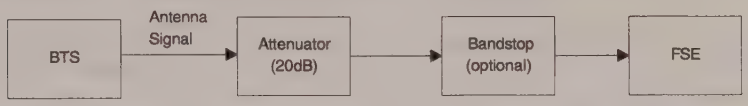


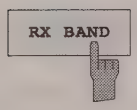
The *<>TX BAND* softkey measures the spurious emissions outside the transmission band.

For BTS above medium power (> about 35 dBm), measurement of the <> TX band requires a bandstop filter for suppressing the carrier(s) in order to achieve the necessary dynamic range.

The bandstop filter has to guarantee a minimum suppression of the carrier of 20 dB. The *TX SUPPR ON* softkey allows then to select an FSE setting more sensitive by 20 dB.

Test setup <> TX band:





The *RX BAND* softkey measures the spurious emissions in the receive band of the base station.

The stringent requirements for spurious measurement in the RX band on BTSs using a combined RX input/TX output demand adequate suppression of the carrier signal(s) (max. carrier level <-10 dBm at the FSE input), eg with the aid of bandpstop filters and/or diplexers. Since the requirements for GSM phase 1 are even more severe, an external low-noise preamplifier is required in addition because of the higher noise floor of FSEB or FSEM compared to FSEA.

With BTSs using a ***separate*** RX input, the TX channel is sufficiently suppressed at the RX input. With the setting RX BAND, the FSE is switched to an attenuation of 0 dB in order to achieve maximum sensitivity.

The *RX BAND GAIN* softkey defines the amplification of the external preamplifier taken into account for the FSE display.

The attenuation of the external attenuator specified under "Setting" is ignored for measurement of the RX band.

Caution: *Under no circumstances a level of + 20 dBm at the entry of the FSE at 0 dBm attenuation of the input attenuator must be exceeded.*

A corresponding warning is displayed upon pressing the RX BAND softkey:

Caution:

Ext. Attenuation ignored, disconnect ext. attenuator
Connect bandpass or bandstop to suppress TX band!

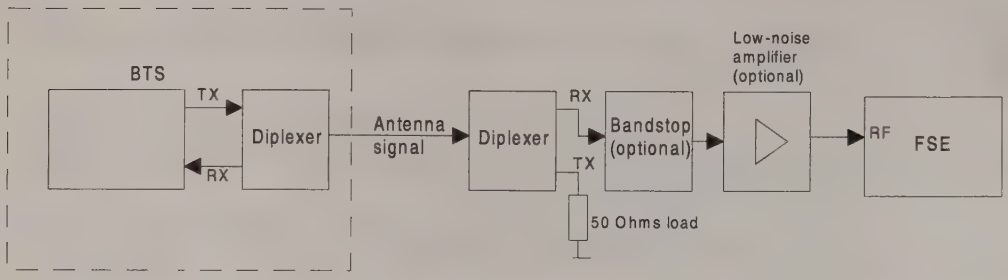
Upon switching from RX to TX or <> TX measurement, the following message is displayed:

Caution:

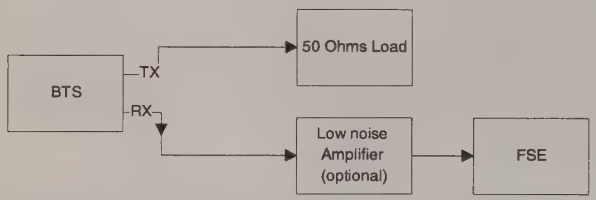
Ext. Attenuator assumed

in order to point out that a different test setup is required.

Test setup for BTSs with combined RX/TX input/output:



Test setup for BTSs with separate RX input and TX output:



The *BTS SFH ON/OFF* softkey drives the base station for measurement in the TX band with slow frequency hopping (position ON).

Frequency hopping is made between the channels B, M and T. For B and T, the channels at the edge of the TX band are fixed whereas M can be selected via the *ARFCN* softkey in the *BTS TEST SETTINGS* menu. For the determination of the spurious emissions in the TX band these three channels are omitted.

The *COSITING GSM/DCS* softkey selects for phase 2 also the RX band of the other standard for measurement

According to the standards for DCS phase II and GSM phase II, the *RX BAND* softkey is used to measure in the TX band of the opposite standard in addition to the RX band(s).

3.6 Description of Commands

3.6.1 Notation

In the following sections, all commands implemented in the instrument are first listed in tables and then described in detail, separated according to the command system. The notation corresponds to the one of the SCPI standards to a large extent. The SCPI conformity information can be taken from the individual description of the commands.

Table of Commands

Command: In the command column, the table provides an overview of the commands and their hierarchical arrangement (see indentations).

Parameter: The parameter column indicates the requested parameters together with their specified range.

Unit: The unit column indicates the basic unit of the physical parameters.

Remark: In the remark column an indication is made on:
- whether the command does not have a query form,
- whether the command has only one query form
- whether this command is implemented only with a certain option of the instrument

Indentations

The different levels of the SCPI command hierarchy are represented in the table by means of indentations to the right. The lower the level is, the farther the indentation to the right is. Please observe that the complete notation of the command always includes the higher levels as well.

Example: `SENSe:FREQuency:CENTer` is represented in the table as follows:

`SENSe`	first level
`:FREQuency`	second level
`:CENTer`	third level

In the individual description, the complete notation of the command is given. An example for each command is written out at the end of the individual description.

Upper/lower case notation

Upper/lower case letters serve to mark the long or short form of the key words of a command in the description (see Section 3.5.2). The instrument itself does not distinguish between upper and lower case letters.

Special characters

| A selection of key words with an identical effect exists for several commands. These key words are indicated in the same line, they are separated by a vertical stroke. Only one of these key words has to be indicated in the header of the command. The effect of the command is independent of which of the key words is indicated.

Example: `SENSe:FREQuency:CW|:FIXed`

The two following commands of identical meaning can be formed. They set the frequency of the constantly frequent signal to 1 kHz:

`SENSe:FREQuency:CW 1E3` = `SENSe:FREQuency:FIXed 1E3`

A vertical stroke in indicating the parameters marks alternative possibilities in the sense of "or". The effect of the command is different, depending on which parameter is entered.

Example: Selection of the parameters for the command

`INPut:COUPling AC | DC`

If parameter AC is selected, only the AC content is fed through, in the case of DC, the DC as well as the AC content.

[ ] Key words in square brackets can be omitted when composing the header (cf. Section 3.5.2, Optional Keywords). The full command length must be accepted by the instrument for reasons of compatibility with the SCPI standards.
Parameters in square brackets can optionally be incorporated in the command or omitted as well.

{ } Parameters in braces can optionally be incorporated in the command either not at all, once or several times.

Description of parameters Due to the standardization, the parameter section of SCPI commands consists always of the same syntactical elements. SCPI has specified a series of definitions therefore, which are used in the tables of commands. In the tables, these established definitions are indicated in angled brackets (<...>) and will be briefly explained in the following (see also Section 3.5.5, "Parameters").

<Boolean> This indication refers to parameters which can adopt two states, "on" and "off". The "off" state may either be indicated by the keyword **OFF** or by the numeric value 0, the "on" state is indicated by **ON** or any numeric value other than zero. Parameter queries are always returned the numeric value 0 or 1.

<numeric_value>

<num> These indications mark parameters which may be entered as numeric values or be set using specific keywords (character data).

The keywords given below are permitted:

MINimum	This keyword sets the parameter to the smallest possible value.
MAXimum	This keyword sets the parameter to the largest possible value.
DEFault	This keyword is used to reset the parameter to its default value.
UP	This keyword increments the parameter value.
DOWN	This keyword decrements the parameter.

The numeric values associated to MAXimum/MINimum/DEFault can be queried by adding the corresponding keywords to the command. They must be entered following the quotation mark.

Example: `SENSe:FREQuency:CENTer? MAXimum`

returns the maximum possible numeric value of the center frequency as result.

<arbitrary block program data>

This keyword is provided for commands the parameters of which consist of a binary data block.

3.6.2 Common Commands

The common commands are taken from the IEEE 488.2 (IEC 625-2) standard. Same commands have the same effect on different devices. The headers of these commands consist of an asterisk "*" followed by three letters. Many common commands refer to the status reporting system which is described in detail in Section 3.8.

Command	Designation	Parameter	Remark
*CAL?	Calibration Query		query only
*CLS	Clear Status		no query
*ESE	Event Status Enable	0 to 255	
*ESR?	Standard Event Status Query	0 to 255	query only
*IDN?	Identification Query	<string>	query only
*IST?	Individual Status Query	0 to 255	query only
*OPC	Operation Complete		
*OPT?	Option Identification Query		query only
*PCB	Pass Control Back	0 to 30	no query
*PRE	Parallel Poll Register Enable	0 to 255	
*PSC	Power On Status Clear	0 | 1	
*RST	Reset		no query
*SRE	Service Request Enable	0 to 255	
*STB?	Status Byte Query		query only
*TRG	Trigger		no query
*TST?	Self Test Query		query only
*WAI	Wait to continue		no query

***CAL?**
CALIBRATION QUERY triggers a calibration of the instrument and subsequently query the calibration status. Any responses > 0 indicate errors.

***CLS**
CLEAR STATUS sets the status byte (STB), the standard event register (ESR) and the EVENt-part of the QUEStionable and the OPERation register to zero. The command does not alter the mask and transition parts of the registers. It clears the output buffer.

***ESE 0 to 255**
EVENT STATUS ENABLE sets the event status enable register to the value indicated. Query *ESE? returns the contents of the event status enable register in decimal form.

***ESR?**

STANDARD EVENT STATUS QUERY returns the contents of the event status register in decimal form (0 to 255) and subsequently sets the register to zero.

***IDN?**

IDENTIFICATION QUERY queries the instrument identification.

The device response is for example: "Rohde&Schwarz, FSE, 123456, 1.03"

FSE = Device
123456 = serial number
1.03 = Firmware versions number

***IST?**

INDIVIDUAL STATUS QUERY returns the contents of the IST flag in decimal form (0 I 1). The IST flag is the status bit which is sent during a parallel poll (cf. Section 3.8.3.2).

***OPC**

OPERATION COMPLETE sets bit 0 in the event status register when all preceding commands have been executed. This bit can be used to initiate a service request (cf. Section 3.7).

***OPC?**

OPERATION COMPLETE QUERY writes message "1" into the output buffer as soon as all preceding commands have been executed (cf. Section 3.7).

***OPT?**

OPTION IDENTIFICATION QUERY queries the options included in the instrument and returns a list of the options installed. The options are separated from each other by means of commas.

Position	Option	
1	FSE-B3	TV Demodulator
2	FSE-B4	Low Phase Noise & OCXO
3	FSE-B5	FFT-Filter
4		reserved
5	FSE-B7	Vector Signal Analysis
6	FSE-B8	Tracking Generator 3.5 GHz
7	FSE-B9	Tracking Generator 3.5 GHz with I/Q modulator
8	FSE-B10	Tracking Generator 7 GHz
9	FSE-B11	Tracking Generator 7 GHz with I/Q modulator
10	FSE-B12	Output Attenuator for Tracking Generator
11		reserved
12		reserved

Example: `0, FSE-B4, 0, 0, FSE-B7, 0, 0, 0, FSE-B11, FSE-B12, 0, 0`

***PCB 0 to 30**

PASS CONTROL BACK indicates the controller address which the IEC-bus control is to be returned to after termination of the triggered action.

***PRE 0 to 255**

PARALLEL POLL REGISTER ENABLE sets parallel poll enable register to the value indicated. Query *PRE? returns the contents of the parallel poll enable register in decimal form.

***PSC 0 | 1**

POWER ON STATUS CLEAR determines whether the contents of the ENABle registers is maintained or reset in switching on.

*PSC = 0 causes the contents of the status registers to be maintained. Thus a service request can be triggered in switching on in the case of a corresponding configuration of status registers ESE and SRE.

*PSC ≠ 0 resets the registers.

Query *PSC? reads out the contents of the power-on-status-clear flag. The response can be 0 or 1.

***RST**

RESET sets the instrument to a defined default status. The command essentially corresponds to pressing the [PRESET] key. The default setting is indicated in the description of the commands.

***SRE 0 to 255**

SERVICE REQUEST ENABLE sets the service request enable register to the value indicated. Bit 6 (MSS mask bit) remains 0. This command determines under which conditions a service request is triggered. Query *SRE? reads the contents of the service request enable register in decimal form. Bit 6 is always 0.

***STB?**

READ STATUS BYTE QUERY reads out the contents of the status byte in decimal form.

***TRG**

TRIGGER triggers all actions waiting for a trigger event (cf. Section "TRIGger subsystem", as well).

***TST?**

SELF TEST QUERY triggers all selftests of the instrument and outputs an error code in decimal form.

***WAI**

WAIT-to-CONTINUE only permits the servicing of the subsequent commands after all preceding commands have been executed and all signals have settled (cf. Section 3.7 and "*OPC" as well).

3.6.3 ABORt Subsystem

The ABORt subsystem contains the commands for aborting triggered actions. An action can be triggered again immediately after being aborted. All commands trigger events which is why they are not assigned any *RST value.

COMMAND	PARAMETERS	UNIT	COMMENT
ABORt	--	--	no query

ABORt

This command aborts a current measurement and resets the trigger system.

Syntax: ABORt

Example: `"ABOR;INIT:IMM"`

Features: *RST value: 0
SCPI: conforming

3.6.4 CALCulate Subsystem

The CALCulate subsystem contains commands for converting instrument data, transforming and carrying out corrections. These functions are carried out subsequent to data acquistion, i.e., following the SENSe subsystem.

In the split-screen representation, a distinction is made between CALCulate1 and CALCulate2:

CALCulate1 ≙ screen A;

CALCulate2 ≙ screen B

3.6.4.1 CALCulate:DELTamarker Subsystem

The CALCulate:DELTamarker subsystem checks the delta-marker functions in the instrument.

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2>			
:DELTamarker<1 to 4>			
[:STATe]	<Boolean>	--	
:MODE	ABSolute|RELative		
:AOFF			no query
:TRACe	<numeric_value>	--	
:X	<numeric_value>	HZ | S | SYM	
:RELative?	--	--	query only
:Y?	--	--	query only
:MAXimum			
[:PEAK]	--	--	no query
:APEak	--	--	no query (option vector analysis)
:NEXT	--	--	no query
:RIGHt	--	--	no query
:LEFT	--	--	no query
:MINimum			
[:PEAK]	--	--	no query
:NEXT	--	--	no query
:RIGHt	--	--	no query
:LEFT	--	--	no query
:FUNCtion			
:FIXed			
[:STATe]	<Boolean>		
:RPOint			
:Y	<numeric_value>	DBM	
:OFFSet	<numeric_value>	DB	
:X	<numeric_value>	HZ |S | SYM	
:PNOise			
[:STATe]	<Boolean>		
:RESult?	--	--	query only
:STEP			
[:INCRement]	<numeric_value>	HZ |S | SYM	
:AUTO	<Boolean>	--	

CALCulate<1|2>:DELTamarker<1 to 4>[:STATe]

This command switches on or off the selected delta marker. If no indication is made, delta marker 1 is selected automatically.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>[:STATe] ON | OFF

Example: "CALC:DELT3 ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:DELTamarker<1 to 4>:MODE

This command switches over between relative and absolute input of frequency of the delta marker.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MODE ABSolute | RELative

Example: "CALC:DELT:MODE ABS"

Features: *RST value: REL
SCPI: device-specific

In the RELative mode, the frequency of the delta marker is programmed relative to the reference marker. In the ABSolute mode, the frequency is defined by the absolute values.

CALCulate<1|2>:DELTamarker<1 to 4>:AOFF

This command switches off all active delta markers.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:AOFF

Example: "CALC:DELT:AOFF"

Features: *RST value: -
SCPI: device-specific

CALCulate<1|2>:DELTamarker<1 to 4>:TRACe

This command assigns the selected delta marker to the indicated measuring curve.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:TRACe <numeric value>
<numeric value> ::= 1 to 4

Example: "CALC:DELT3:TRAC 2"

Features: *RST value: -
SCPI: device-specific

CALCulate<1|2>:DELTamarker<1 to 4>:X

This command positions the selected delta marker to the indicated frequency (span > 0) or time (span = 0). The query always returns the absolute frequency or time.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:X <numeric value>
<numeric value> ::= 0 to MAX (frequency) | MAX (sweep time) | MAX (symbols)

Example: "CALC:DELT:X 10.7MHz"

Features: *RST value: -
SCPI: device-specific

The SYM unit is only valid in conjunction with option FSE-B7, Vector Signal Analysis. When used as a query, this command always returns the absolute value of the frequency or time.

CALCulate<1|2>:DELTamarker<1 to 4>:X:RELative?

This command queries the frequency (span > 0) or time (span = 0) of the selected delta marker relative to the reference marker.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:X:RELative?

Example: "CALC:DELT:X:REL?"

Features: *RST value: -
SCPI: device-specific

CALCulate<1|2>:DELTamarker<1 to 4>:Y?

This command queries the value of the selected marker.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:Y?

Example: "CALC:DELT:Y?"

Features: *RST value: -
SCPI: device-specific

CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum[:PEAK]

This command positions the delta marker to the current maximum value in the trace memory.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum[:PEAK]

Example: "CALC:DELT:MAX"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:APEak

This command positions the delta marker to the maximum absolute value of the trace.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:APEak

Example: "CALC:DELT:MAX:APE"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:NEXT

This command positions the delta marker to the next smaller maximum value in the trace memory.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:NEXT

Example: "CALC:DELT:MAX:NEXT"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:RIGHt

This command positions the delta marker to the next smaller maximum value to the right of the current value (i.e., in ascending X direction) in the trace memory.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:RIGHt

Example: "CALC:DELT:MAX:RIGH"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:LEFT

This command positions the delta marker to the next smaller maximum value to the left of the current value (i.e., in descending X direction) in the trace memory.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:LEFT

Example: `"CALC:DELT:MAX:LEFT"`

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MINimum[:PEAK]

This command positions the delta marker to the current minimum value in the trace memory.

Syntax: <1|2>:DELTamarker<1 to 4>:MINimum[:PEAK]

Example: `"CALC:DELT:MIN"`

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:NEXT

This command positions the delta marker to the next higher minimum value in the trace memory.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:NEXT

Example: `"CALC:DELT:MIN:NEXT"`

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:RIGHt

This command positions the delta marker to the next higher minimum value to the right of the current value (ie in ascending X direction).

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:RIGHt

Example: `"CALC:DELT:MIN:RIGH"`

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:LEFT

This command positions the delta marker to the next higher minimum value to the left of the current value (ie in descending X direction).

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:LEFT

Example: `"CALC:DELT:MIN:LEFT"`

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed[:STATe]

This command switches the relative measurement to a fixed reference value on or off.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed[:STATe] ON | OFF

Example: "CALC:DELT:FUNC:FIX ON"

Features: *RST value: OFF
SCPI: device-specific.

The reference value is independent of the current trace.

CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed:RPOint:Y

This command defines a new fixed reference value for the relative measurement.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed:RPOint:Y
<numeric_value>

Example: "CALC:DELT:FUNC:FIX:RPO:X -10dBm"

Features: *RST value: - (FUNction:FIXed[:STATe] is set to OFF)
SCPI: device-specific

The reference value is independent of the current trace.

CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed:RPOint:Y:OFFSet

This command defines an additional level offset for the relative measurement.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed:RPOint:Y:OFFSet
<numeric_value>

Example: "CALC:DELT:FUNC:FIX:RPO:Y:OFFS 10dB"

Features: *RST value: 0 dB
SCPI: device-specific

The level offset is included in the output of the level value.

CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed:RPOint:X

This command defines the new fixed reference frequency, time or symbols for the relative measurement.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed:RPOint:X
<numeric_value>

Example: "CALC:DELT:FUNC:FIX:RPO:X 10.7MHz"

Features: *RST value: - (FUNction:FIXed[:STATe] is set to OFF)
SCPI: device-specific

The reference value is independent of the current trace. With span = 0, the reference time, otherwise the reference frequency is defined.

CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:PNOise[:STATe]

This command switches the measurement of the phase noise on or off.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:PNOise[:STATe] ON | OFF

Example: "CALC:DELT:FUNC:PNO ON"

Features: *RST value: OFF
SCPI: device-specific

When the phase noise is measured, the correction values for the bandwidth and the log amplifier are automatically considered. The measurement uses the reference values defined by FUNCtion:FIXed:RPOint:X or Y.

CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:PNOise:RESult?

This command queries the result of the phase noise measurement.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:PNOise:RESult?

Example: "CALC:DELT:FUNC:PNO:RES?"

Features: *RST value: -
SCPI: device-specific

This command is only a query which is why it is not assigned an *RST value.

CALCulate<1|2>:DELTamarker<1 to 4>:STEP[:INCRement]

This command defines the delta marker step width.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:STEP[:INCRement] <numeric_value>

Example: "CALC:DELT:STEP 10kHz" (frequency domain)
"CALC:DELT:STEP 5ms" (time domain)
"CALC:DELT:STEP 20SYM" (time domain)

Features: *RST value: - (STEP is set to AUTO)
SCPI: device-specific

CALCulate<1|2>:DELTamarker<1 to 4>:STEP:AUTO

This command switches the automatic adaptation of the marker step width on or off.

Syntax: CALCulate<1|2>:DELTamarker<1 to 4>:STEP:AUTO ON | OFF

Example: "CALC:DELT:STEP:AUTO OFF"

Features: *RST value: ON
SCPI: device-specific

With AUTO ON, the step width is 10% of the span.

3.6.4.2 CALCulate:DLINe Subsystem

The CALCulate:DLINe subsystem checks the display lines in the instrument, i.e., the level, frequency and time lines (depending on the X-axis) as well as threshold and reference lines.

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2>			
:DLINe<1|2>	<numeric_value>	DBM | DB | DEG | RAD | S | HZ | PCT	
:STATe	<Boolean>		
:THReshold	<numeric_value>	DBM | DB | DEG | RAD | S | HZ | PCT	
:STATe	<Boolean>		
:RLINe	<numeric_value>	DBM | DB | DEG | RAD | S | HZ | PCT	
:STATe	<Boolean>		
:FLINe<1|2>	<numeric_value>	HZ	
:STATe	<Boolean>		
:TLINe<1|2>	<numeric_value>	S | SYM	
:STATe	<Boolean>		

CALCulate<1|2>:DLINe<1|2>

This command defines the position of the display line.

Syntax: CALCulate:DLINe<1|2> <numeric_value>
<numeric_value>::= MINimum to MAXimum (depending on current unit)

Example: "CALC:DLIN -20dBm"

Features: *RST value: - (STATe to OFF)
SCPI: device-specific

The display lines mark the given level in the display.

The units DEG, RAD, S, HZ, and PCT are only valid in conjunction with option Vector Signal Analysis, FSE-B7.

CALCulate<1|2>:DLINe<1|2>:STATe

This command switches the display line on or off.

Syntax: CALCulate:DLINe<1|2>:STATe ON | OFF

Example: "CALC:DLIN2:STAT OFF"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:THReshold

This command defines the position of the thresholds.

Syntax: CALCulate:THReshold <numeric_value>
<numeric_value>::= MINimum to MAXimum (depending on current unit)

Example: "CALC:THR -82dBm"

Features: *RST value: - (STATe to OFF)
SCPI: device-specific

For marker scan functions MAX PEAK, NEXT PEAK etc., the threshold serves as the lowest limit for maximum or minimum search. The units DEG, RAD, S, HZ, and PCT are only valid in conjunction with option Vector Signal Analysis, FSE-B7.

CALCulate<1|2>:THReshold:STATe

This command switches the threshold on or off.

Syntax: CALCulate:THReshold ON | OFF

Example: "CALC:THR:STAT ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:RLINe

This command defines the position of the reference line.

Syntax: CALCulate:RLINe <numeric_value>
<numeric_value>::= MINimum to MAXimum (depending on the current unit)

Example: "CALC:RLIN -10dBm"

Features: *RST value: - (STATe to OFF)
SCPI: device-specific

The reference line serves as a reference for the arithmetic operation of traces.

The units DEG, RAD, S, HZ, and PCT are only valid in connection with option FSE-B7, Vector Signal Analysis.

CALCulate<1|2>:RLINe:STATe

This command switches the reference line on or off.

Syntax: CALCulate:RLINe:STATe ON | OFF

Example: "CALC:RLIN:STAT ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:FLINe<1|2>

This command defines the position of the frequency lines.

Syntax: CALCulate:FLINe<1|2> <numeric_value>
<numeric_value>::= 0 GHz to f_{max}

Example: "CALC:FLIN2 120MHz"

Features: *RST value: - (STATe to OFF)
SCPI: device-specific

The frequency lines mark the given frequencies in the display. Frequency lines are only valid for a SPAN >0.

CALCulate<1|2>:FLINe<1|2>:STATe

This command switches the frequency line on or off.

Syntax: CALCulate:FLINe<1|2>:STATe ON | OFF

Example: "CALC:FLIN2:STAT ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:TLINe<1|2>

This command defines the position of the time lines.

Syntax: CALCulate:TLINe<1|2> <numeric_value>
<numeric_value>::= 0 to 1000s

Example: "CALC:TLIN 10ms"

Features: *RST value: - (STATe to OFF)
SCPI: device-specific

The time lines mark the given times in the display. Time lines are only valid for a SPAN = 0.

CALCulate<1|2>:TLINe<1|2>:STATe

This command switches the time line on or off.

Syntax: CALCulate:TLINe<1|2>:STATe ON | OFF

Example: "CALC:TLIN2:STAT ON"

Features: *RST value: OFF
SCPI: device-specific

3.6.4.3 CALCulate:FEED Subsystem

The CALCulate:FEED subsystem selects the measured data in operating mode vector signal analysis. This sub system is only valid in connection with option FSE-B7, Vector Signal Analysis.

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2> :FEED	<string>		Vector Signal Analysis no query

CALCulate<1|2>:FEED

This command selects the measured data that are to be displayed

Syntax: CALCulate<1|2>:FEED <string>
<string>::= 'XTIM:DDEM:MEAS' |
'XTIM:DDEM:REF' |
'XTIM:DDEM:ERR:MPH' |
'XTIM:DDEM:ERR:VECT' |
'XTIM:DDEM:SYMB' |
'XTIM:AM' |
'XTIM:FM' |
'XTIM:PM' |
'XTIM:AMSummary' |
'XTIM:FMSummary' |
'XTIM:PMSummary' |
'TCAP'

Example: "CALC:FEED 'XTIM:DDEM:SYMB'"

Features: *RST value: 'XTIM:DDEM:MEAS'
SCPI: conforming

The string parameters have the following meaning:

'XTIM:DDEM:MEAS'	Test signal (filtered, synchronized to symbol clock)
'XTIM:DDEM:REF'	Reference signal (internally generated from demodulated test signal)
'XTIM:DDEM:ERR:MPH'	Error signal (magnitude and phase error)
'XTIM:DDEM:ERR:VECT'	Vector error signal
'XTIM:DDEM:SYMB'	Symbol table (demodulated bits and table with modulation errors)
'XTIM:AM'	Demodulated AM signal (analog demodulation)
'XTIM:FM'	Demodulated FM signal (analog demodulation)
'XTIM:PM'	Demodulated PM signal (analog demodulation)
'XTIM:AMSummary'	AM-Summary Marker (analog demodulation)
'XTIM:FMSummary'	FM-Summary Marker (analog demodulation)
'XTIM:PMSummary'	PM-Summary Marker (analog demodulation)
'TCAP'	Test signal in capture buffer

This command is only valid in conjunction with option Vector Signal Analysis, FSE-B7.

3.6.4.4 CALCulate:FORMat Subsystem

The CALCulate:FORMat subsystem determines further processing and conversion of measured data in operating mode vector signal analysis.
This sub system is only valid in connection with option FSE-B7, Vector Signal Analysis.

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2> :FORMat	MAGNitude | PHASe | UPHase | RIMag | FREQuency | IEYE | QEYE | TEYE | FEYE | COMP | CONS		Vector Signal Analysis
:FSK :DEViation :REFerence	<numeric_value>	HZ	Vector Signal Analysis

CALCulate<1|2>:FORMat

This command defines the display of the traces.

Syntax: CALCulate<1|2>:FORMat MAGNitude | PHASe | UPHase | RIMag | FREQuency | IEYE | QEYE | TEYE | FEYE | COMP | CONS

Example: "CALC:FORM CONS"

Features: *RST value: MAGNitude
SCPI: conforming

The parameters have the following meaning:

MAGNitude	Display of the magnitude in the time domain
PHASe | UPHase	Display of the phase in the time domain with or without ("unwrapped") limitation to ±180°
RIMag	Display of the time characteristic of inphase and quadrature component
FREQuency	Display of the frequency response in the time domain
IEYE | QEYE	Eye diagram of the inphase or quadrature component
TEYE	Display of the trellis diagram
FEYE	Eye diagram of FSK modulation
COMP	Display of the polar vector diagram (complex)
CONS	Display of the polar vector diagaram (constellation)

This command is only valid in conjunction with option Vector Signal Analysis, FSE-B7.

CALCulate<1|2>:FSK:DEViation:REFerence

This command defines the reference value of the frequency deviation for FSK modulation.

Syntax: CALCulate<1|2>:FSK:DEViation:REFerence <numeric_value>

Example: "CALC:FSK:DEV:REF 20kHz"

Features: *RST value: -
SCPI: device-specific

This command is only valid in conjunction with option Vector Signal Analysis, FSE-B7.

3.6.4.5 CALCulate:LIMit Subsystem

The CALCulate:LIMit subsystem comprises the limit lines and the corresponding limit checks. Limit lines can be defined as upper and lower limit lines. The individual values of the limit lines correspond to the values of the X-axis (CONTrol) which have to have the same number.

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate			
:LIMit<1 to 8>			
:STATe	<Boolean>	--	
:UNIT	DBM | DBPW | WATT | DBUV | DBMV | VOLT | DBUA | AMPere | DB | DBUV_MHZ | DBMV_MHZ | DBUA_MHZ | DBUV_M | DBUA_M | DBUV_MMHZ | DBUA_MMHZ | DEG | RAD | S | HZ | PCT | UNITLESS		
:CONTrol			
[:DATA]	<numeric_value>,<numeric_value>..	HZ | S | SYM	
:DOMain	FREQuency | TIME		
:OFFSet	<numeric_value>	HZ | S | SYM	
:MODE	RELative | ABSolute		
:UNIT			
[:TIME]	S | SYM		
:SHIFt	<numeric_value>	HZ | S | SYM	Vector Signal Analysis
:UPPer			
[:DATA]	<numeric_value>,<numeric_value>..	DBM | DB | DEG | RAD | S | HZ | PCT	
:STATe	<Boolean>	--	
:OFFSet	<numeric_value>	DB | DEG | RAD | S | HZ | PCT	
:MARGin	<numeric_value>	DB| DEG | RAD | S | HZ | PCT	
:MODE	RELative | ABSolute	--	
:SHIFt	<numeric_value>	DB | DEG | RAD| S | HZ | PCT	
:LOWer			
[:DATA]	<numeric_value>,<numeric_value>..	DBM | DB | DEG | RAD | S | HZ | PCT	
:STATe	<Boolean>	--	
:OFFSet	<numeric_value>	DB| DEG | RAD | S | HZ | PCT	
:MARGin	<numeric_value>	DB| DEG | RAD | S | HZ | PCT	
:MODE	RELative | ABSolute	--	
:SHIFt	<numeric_value>	DB | DEG | RAD | S | HZ | PCT	
:FAIL?			query only
:CLEar		--	
[:IMMediate]	--	--	no query
:COMMent			
:COPY	<string>		
:NAME	1 to 8 | < name>		
:DELete	<string>		
:BURSt	--		Option FSE-K11 or K10
:PTEMplate?			
:POWer?	--		

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate			
:LIMit<1 to 8>		--	
:SPECtrum	--		Option FSE-K11 or FSE-K10
:MODulation?	ARFCn | TXBand | RXBand | COMBined | DCSRx1800		
:FAILs?	ARFCn | TXBand | RXBand | COMBined | DCSRx1800		
:EXCeptions?	ARFCn | TXBand | RXBand | COMBined | DCSRx1800		
:SWITching?	ARFCn | TXBand | RXBand | COMBined		Option FSE-K11 or FSE-K10
:FAILs?	ARFCn | TXBand | RXBand | COMBined		
:SPURious?	TXBand | OTXBand | RXBand | IDLeband		Option FSE-K11 or FSE-K10
:FAILs?	TXBand | OTXBand | RXBand | IDLeband		
:MARGin	<numeric_value>	DB	
:ACPower			
[:STATe]	<Boolean>		
:ACHannel	<numeric_value>, <numeric_value>	DB; DB	
:STATe	<Boolean>		
:RESult?	--		query only
:ALTernate<1|2>	<numeric_value>, <numeric_value>	DB; DB	
:STATe	<Boolean>		
:RESult?	--		query only

CALCulate<1|2>:LIMit<1 to 8>:STATe

This command switches the limit check for the selected limit line on or off.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:STATe ON | OFF

Example: `"CALC:LIM:STAT ON"`

Features: *RST value: OFF
SCPI: conforming

The result of the limit check can be queried with `CALCulate:LIMit:FAIL?`.

CALCulate<1|2>:LIMit<1 to 8>:UNIT

This command defines the unit of the selected limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:UNIT DBM | DBPW | WATT | DBUV | DBMV | VOLT | DBUA | AMPere | DB | DBUV_MHZ | DBMV_MHZ | DBUV_M | DBUA_M | DBUV_MMHZ | DBUA_MMHZ |DEG | RAD | S | HZ | PCT | UNITLESS

Example: `"CALC:LIM:UNIT DBUV"`

Features: *RST value: DBM
SCPI: device-specific

DBUV_MHZ and DBUA_MHZ denote the units DBUV/MHZ or DBUA/MHZ. The units DEG, RAD, S, HZ, PCT are available in the signal analysis mode only.
Upon selection of the unit DB the limit line is automatically switched to the relative mode. For units different from DB the limit line is automatically switched to the absolute mode.

CALCulate<1|2>:LIMit<1 to 8>:CONTrol[:DATA]

This command defines the X-axis values (frequencies or times) of the upper or lower limit lines.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:CONTrol[:DATA]
<numeric_value>,<numeric_value>..

Example: "CALC:LIM:CONT 1MHz,30MHz,300MHz,1GHz"

Features: *RST value: - (LIMit:STATe is set to OFF)
SCPI: conforming

The number of values for the CONTrol axis and the corresponding UPPer- and/or LOWer limit lines have to be identical.

CALCulate<1|2>:LIMit<1 to 8>:CONTrol:DOMain

This command defines the X-axis in the frequency or time domain.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:CONTrol:DOMain FREQuency | TIME

Example: "CALC:LIM:CONT:DOM TIME"

Features: *RST value: FREQuency
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:CONTrol:OFFSet

This command defines an offset for the X-axis value of the selected relative limit line in the frequency or time domain.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:CONTrol:OFFset <numeric_value>

Example: "CALC:LIM:CONT:OFFS 100us"

Features: *RST value: 0
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:CONTrol:MODE

This command selects the relative or absolute scaling for the X-axis of the selected limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:CONTrol:MODE RELative | ABSolute

Example: "CALC:LIM:CONT:MODE REL"

Features: *RST value: ABSolute
SCPI: device-specific

Upon selection of RELative, the unit is switched to DB.

CALCulate<1|2>:LIMit<1 to 8>:CONTrol:UNIT[:TIME]

This command defines the unit of the x-axis scaling of limit lines.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:CONTrol:UNIT[:TIME] S | SYM

Example: "CALC:LIM:CONT:UNIT SYM"

Features: *RST value: S
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:LIMit<1 to 8>:CONTrol:SHIFt

This command shifts a limit line which has been specified for relative frequencies or times (X-axis).

Syntax: CALCulate<1|2>:LIMit<1 to 8>:CONTrol:SHIFt <numeric_value>

Example: "CALC:LIM:CONT:SHIF 50kHz"

Features: *RST value: --
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:LIMit<1 to 8>:UPPer[:DATA]

This command defines the values for the upper limit lines.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:UPPer[:DATA]
<numeric_value>,<numeric_value>..

Example: "CALC:LIM:UPP -10,0,0,-10"

Features: *RST value: - (LIMit:STATe is set to OFF)
SCPI: conforming

The number of values for the CONTrol axis and the corresponding UPPer limit line have to be identical. If the measured values exceed the UPPer limit line, the limit check signals errors. The unit must be identical with the unit selected by CALC:LIM:UNIT. The units DEG, RAD, S, HZ, PCT are available in the vector signal analysis mode only.

CALCulate<1|2>:LIMit<1 to 8>:UPPer:STATe

This command defines the selected limit line as upper limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:UPPer:STATe ON | OFF

Example: "CALC:LIM:UPPer:STAT ON"

Features: *RST value: OFF
SCPI: conforming

The result of the limit check can be queried with CALCulate:LIMit<1 to 8>:FAIL?.

CALCulate<1|2>:LIMit<1 to 8>:UPPer:OFFSet

This command defines an offset for the Y-axis of the selected relative upper limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:UPPer:OFFset <numeric_value>

Example: "CALC:LIM:UPP:OFFS 3dB"

Features: *RST value: 0
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:UPPer:MARGin

This command defines the margin of the selected upper limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:UPPer:MARGin <numeric_value>

Example: "CALC:LIM:UPP:MARG 10dB"

Features: *RST value: 0
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:UPPer:MODE

This command selects the relative or absolute scaling for the Y-axis of the selected upper limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:UPPer:MODE RELative | ABSolute

Example: "CALC:LIM:UPP:MODE REL"

Features: *RST value: ABSolute
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:UPPer:SHIFt

This command shifts a limit line, which has relative values for the Y-axis (levels or linear units such as volt).

Syntax: CALCulate<1|2>:LIMit<1 to 8>:Upper:SHIFt <numeric_value>

Example: "CALC:LIM:UPP:SHIF 20dB"

Features: *RST value: --
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:LIMit<1 to 8>:LOWer[:DATA]

This command defines the values for the selected lower limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:LOWer[:DATA]
<numeric_value>,<numeric_value>..

Example: "CALC:LIM:LOW -30,-40,-40,-30"

Features: *RST value: - (LIMit:STATe is set to OFF)
SCPI: conforming

The number of values for the CONTrol axis and the corresponding LOWer limit line have to be identical. If the measured values violate the LOWer limit line, the limit check signals errors.
The unit must be identical with the unit selected by CALC:LIM:UNIT. The units DEG, RAD, S, HZ, PCT are available in the vector signal analysis mode only.

CALCulate<1|2>:LIMit<1 to 8>:LOWer:STATe

This command defines the selected limit line as lower limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:LOWer:STATe ON | OFF

Example: `"CALC:LIM:LOWer:STAT ON"`

Features: *RST value: OFF
SCPI: conforming

The result of the limit check can be queried with `CALCulate:LIMit:FAIL?`.

CALCulate<1|2>:LIMit<1 to 8>:LOWer:OFFSet

This command defines an offset for the Y-axis of the selected relative lower limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:LOWer:OFFset <numeric_value>

Example: `"CALC:LIM:LOW:OFFS 3dB"`

Features: *RST value: 0
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:LOWer:MARGin

This command defines the margin of the selected lower limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:LOWer:MARGin <numeric_value>

Example: `"CALC:LIM:LOW:MARG 10dB"`

Features: *RST value: 0
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:LOWer:MODE

This command selects the relative or absolute scaling for the Y-axis of the selected lower limit line.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:LOWer:MODE RELative | ABSolute

Example: `"CALC:LIM:LOW:MODE REL"`

Features: *RST value: ABSolute
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:LOWer:SHIFt

This command shifts a limit line, which has relative values for the Y-axis (levels or linear units such as volt).

Syntax: CALCulate<1|2>:LIMit<1 to 8>:LOWer:SHIFt <numeric_value>

Example: `"CALC:LIM:LOW:SHIF 20dB"`

Features: *RST value: --
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:LIMit<1 to 8>:FAIL?

This command queries the result of the limit check.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:FAIL?

Example: `"CALC:LIM:FAIL?"`

Features: *RST value: -
SCPI: conforming

The result of the limit check responds with 0 in case of PASS and with 1 in case of FAIL.

CALCulate<1|2>:LIMit<1 to 8>:CLEar[:IMMediate]

This command deletes the result of the current limit check.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:CLEar[:IMMediate]

Example: `"CALC:LIM:CLE"`

Features: *RST value: -
SCPI: conforming

This command is an event which is why it is not assigned an *RST value.

CALCulate<1|2>:LIMit<1 to 8>:COMMent

This command defines a comment for the limit line selected.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:COMMent <string>

Example: `"CALC:LIM:COMM 'Upper limit for spectrum'"`

Features: *RST value: blank comment
SCPI: device-specific

CALCulate<1|2>:LIMit<1 to 8>:COPY

This command copies one limit line onto another one.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:COPY 1 to 8 | <name>
1 to 8 ::= number of the new limit line or, alternatively:
<name> ::= name of the new limit line given as a string

Example: `"CALC:LIM1:COPY 2"`
`"CALC:LIM1:COPY 'GSM2'"`

Features: *RST value: --
SCPI: device-specific

The name of the limit line may contain a maximum of 8 characters. This command is an "event" which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:LIMit<1 to 8>:NAME

This command assigns a name to a limit line numbered 1 to 8. If it doesn't exist previously, a limit line with this name is created.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:NAME <string>
<string> ::= name off limit line

Example: "CALC:LIM1:NAME 'GSM1'"

Features: *RST value: 'REM1' to 'REM8' for lines 1 to 8
SCPI: device-specific

The name of the limit line may contain a maximum of 8 characters.

CALCulate<1|2>:LIMit<1 to 8>:DELete

This command deletes the limit line selected.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:DELete

Examples: "CALC:LIM1:DEL"

Features: *RST value: --
SCPI: device-specific

This command is an "event" which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:LIMit<1 to 8>:BURSt:PTEMplate?

This command queries the result of the limit check for a power vs. time measurement.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:BURSt:PTEMplate?

Examples: "CALC:LIM:BURS:PTEM?"

The result is displayed in character data form. Possible values are:

PASSED	limit not exceeded
FAILED	limit exceeded
RUNNING	measurement not completed

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
If no measurement has been carried out yet, a query error is triggered off. The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:BURSt:POWer?

This command queries the total result of the carrier power measurement.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:BURSt:POWer?

The result is displayed in character data form. Possible values are:

PASSED	limit not exceeded
FAILED	limit exceeded
ABORTED	measurement aborted
RUNNING	measurement not completed

Examples: "CALC:LIM:BURS:POW?"
Result: PASSED

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
If the command is triggered off before the carrier power measurement was started for the first time, a query error results. The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:MODulation?

This command queries the total result of the spectrum due to modulation measurement.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:MODulation?
ARFCn | TXBand | RXBand | COMBined | DCSRx1800
ARFCn::= ARFCN ± 1.8 MHz
TXBand::= TX-band
RXBand::= RX-band
COMBined::= ARFCN ± 1.8 MHz / TX-band
DCSRx1800::= RX-Band DCS 1800 (option FSE-K10 only)

The result is displayed in character data form. Possible values are:

PASSED	limit not exceeded
FAILED	limit exceeded
ABORTED	measurement aborted
RUNNING	measurement not completed

Examples: "CALC:LIM:SPEC:MOD? RXB"
Result: PASSED

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:MODulation:FAILs?

This command queries the number of limit violations of the spectrum due to modulation measurement.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:MODulation:FAILs?
ARFCn | TXBand | RXBand | COMBined | DCSRx1800
ARFCn::= ARFCN ± 1.8 MHz
TXBand::= TX-band
RXBand::= RX-band
COMBined::= ARFCN ± 1.8 MHz / TX-band
DCSRx1800::= RX-Band DCS 1800 (option FSE-K10 only)

Examples: "CALC:LIM:SPEC:MOD:FAIL? RXB"

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:MODulation:EXCeptions?

This command queries the number of limit violations of the spectrum due to modulation measurement which are marked as exceptions.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:MODulation:EXCeptions?
ARFCn | TXBand | RXBand | COMBined | DCSRx1800
ARFCn::= ARFCN ± 1.8 MHz
TXBand::= TX-band
RXBand::= RX-band
COMBined::= ARFCN ± 1.8 MHz / TX-band
DCSRx1800::= RX-Band DCS 1800 (option FSE-K10 only

Examples: "CALC:LIM:SPEC:MOD:EXC? RXB"

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:SWITching?

This command queries the total result of the spectrum due to switching transients measurements.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:SWITching?
ARFCn | TXBand | RXBand | COMBined

ARFCn::= ARFCN ± 1.8 MHz
TXBand::= TX-band
RXBand::= RX-band
COMBined::= ARFCN ± 1.8 MHz / TX-band

The result is displayed in character data form. Possible values are:

PASSED	limit not exceeded
FAILED	limit exceeded
ABORTED	measurement aborted
RUNNING	measurement not completed

Examples: "CALC:LIM:SPEC:SWIT?"
Result: PASSED

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:SWITching:FAILs?

This command queries the number of limit violations of the spectrum due to switching transient measurement.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:SPECtrum:SWITching:FAILs?
ARFCn | TXBand | RXBand | COMBined

ARFCn::= ARFCN ± 1.8 MHz
TXBand::= TX-band
RXBand::= RX-band
COMBined::= ARFCN ± 1.8 MHz / TX-band

Examples: "CALC:LIM:SPEC:SWIT:FAIL?"

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:SPURious?

This command queries the total result of the spurious emissions measurement.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:SPURious?
TXBand | OTXBand | RXBand | IDLeband

TXBand::= TX-band
OTXBand::= Not TX-band
RXBand::= RX-band (option FSE-K11 only)
IDLeband::= IDLeband (option FSE-K10 only)

The result is displayed in character data form. Possible values are:

PASSED	limit not exceeded
FAILED	limit exceeded
ABORTED	measurement aborted
RUNNING	measurement not completed

Examples:
```
"CALC:LIM:SPUR? OTXB"
Result:PASSED
```

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:SPURious:FAILs?

This command queries the number of limit violations of the spurious emissions measurement.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:SPURious:FAILs?
TXBand | OTXBand | RXBand | IDLeband

TXBand::= TX-band
OTXBand::= Not TX-band
RXBand::= RX-band (option FSE-K11 only)
IDLeband::= IDLeband (option FSE-K10 only)

Examples:
```
"CALC:LIM:SPUR:FAIL? OTXB"
```

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. It is available with option GSM BTS analyzer FSE-K11 or GSM MS Analyzer FSE-K10.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:MARGin

This command sets/changes the value of the margin (safe difference to the actual limit) for the limit check.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:MARGin <numeric_value>
<numeric_value> ::= 0 to 100DB

Examples:
```
"CALC:LIM:MARG 6DB"
```

Features: *RST value: 3DB
SCPI: device-specific

This command is available with options GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10 only. The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:ACPower[:STATe]

This command switches on and off the limit check for adjacent channel power measurements. The commands `CALC:LIM:ACP:ACH:STAT` or `CALC:LIM:ACP:ALT:STAT` must be used in addition to specify whether the limit check is to be performed for the upper/lower adjacent channel or for the alternate adjacent channels.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:ACPower[:STATe] ON | OFF

Examples: `"CALC:LIM:ACP ON"`

Features: *RST value: OFF
SCPI: device-specific

The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:ACPower:ACHannel

This command defines the limit for the upper/lower adjacent channel for adjacent channel power measurements.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:ACPower:ACHannel <num_value>,<num_value>
<numeric_value> ::= 0 to 100 dB.
The first (second) numeric value is the limit for the upper (lower) adjacent channel.

Examples: `"CALC:LIM:ACP:ACH 30DB, 30DB"`

Features: *RST value: 0 dB
SCPI: device-specific

The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:ACPower:ACHannel:STATe

This command activates the limit check for the adjacent channel when adjacent channel power measurement is performed. Before, the limit check must be activated using `CALC:LIM:ACP ON`.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:ACPower:ACHannel:STATe ON | OFF

Examples: `"CALC:LIM:ACP:ACH:STAT ON"`

Features: *RST value: OFF
SCPI: device-specific

The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:ACPower:ACHannel:RESult?

This command queries the result of the limit check for the upper/lower adjacent channel when adjacent channel power measurement is performed.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:ACPower:ACHannel:RESult?

The result is returned in the form <result>, <result> where
<result> = PASSED | FAILED, and where the first returned value denotes the lower, the second denotes the upper adjacent channel.

Examples: `"CALC:LIM:ACP:ACH:RES?"`

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. If the power measurement of the adjacent channel is switched off, the command triggers a query error.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:ACPower:ALTernate<1|2>

This command defines the limit for the first/second alternate adjacent channel for adjacent channel power measurements.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:ACPower:ALTernate<1|2>
<numeric_value>,<numeric_value>

<numeric_value> ::= 0 to 100DB.

The first (second) numeric value is the limit for the lower (upper) alternate adjacent channel. The numeric suffix after `ALTernate<1|2>` denotes the first or the second alternate channel.

Examples: `"CALC:LIM:ACP:ALT2 30DB 30DB"`

Features: *RST value: 0DB
SCPI: device-specific

The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:ACPower:ALTernate<1|2>:STATe

This command activates the limit check for the first/second alternate adjacent channel for adjacent channel power measurements. Before, the limit check must be activated using `CALC:LIM:ACP ON`.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:ACPower:ALTernate<1|2>:STATe ON | OFF

Examples: `"CALC:LIM:ACP:ALT2:STAT ON"`

Features: *RST value: OFF
SCPI: device-specific

The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

CALCulate<1|2>:LIMit<1 to 8>:ACPower:ALTernate<1|2>:RESult?

This command queries the result of the limit check for the first/second alternate adjacent channel for adjacent channel power measurements.

Syntax: CALCulate<1|2>:LIMit<1 to 8>:ACPower:ALTernate<1|2>:RESult?
The result is returned in the form <result>, <result> where
<result> = PASSED | FAILED and where the first (second) returned value denotes the lower (upper) alternate adjacent channel.

Examples: `"CALC:LIM:ACP:ALT2:RES?"`

Features: *RST value: --
SCPI: device-specific

This command is a query and therefore not assigned a *RST value. If the power measurement of the adjacent channel is switched off, the command triggers a query error.
The numeric suffixes <1|2> or <1 to 8> are not significant for this command.

3.6.4.6 CALCulate:MARKer Subsystem

The CALCulate:MARKer subsystem checks the marker functions in the instrument.

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2>			
:MARKer<1 to 4>			
[:STATe]	<Boolean>	--	
:AOFF			no query
:TRACe	<numeric_value>	--	
:X	<numeric_value>	HZ|S	
:SLIMits			
[:STATe]	<Boolean>		
:COUNt	<Boolean>	--	
:RESolution	<numeric_value>	HZ	
:FREQuency?	--	--	query only
:COUPled			
[:STATe]	<Boolean>		
:LOEXclude	<Boolean>		
:Y?	--	--	query only
:MAXimum			
[:PEAK]	--	--	no query
:APEak	--	--	no query, Vector Signal Analysis
:NEXT	--	--	no query
:RIGHt	--	--	no query
:LEFT	--	--	no query
:MINimum			
[:PEAK]	--	--	no query
:NEXT	--	--	no query
:RIGHt	--	--	no query
:LEFT	--	--	no query
:STEP			
[:INCRement]	<numeric_value>	HZ I S I SYM	
:AUTO	<Boolean>	--	
:PEXCursion	<numeric_value>	dB	
:READout	MPHase I RIMaginary		Vector Signal Analysis
:FUNCtion			
:NDBDown	<numeric_value>	DB	
:STATe	<Boolean>		
:RESult?	--	--	query only
:FREQuency?	--	--	query only
:ZOOM	<numeric_value>	HZ	no query
:NOISe			
[:STATe]	<Boolean>		
:RESult?	--	--	query only
:DEModulation			
:SELect	AM|FM		
[:STATe]	<Boolean>		
:HOLDoff	<numeric_value>	S	
:SFACtor	<expr>		
:STATe	<Boolean>		
:RESult?	--	--	query only
:FREQuency?	--	--	query only

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2>			
:MARKer			
:FUNCtion			
:STRack	<Boolean>		
[:STATe]			
:ADEMod			Vector Signal Analysis
:AM			
[:RESult?]	PPEak | MPEak | MIDDle | RMS		query only
:FM			
[:RESult?]	PPEak | MPEak | MIDDle | RMS | RDEV		query only
:PM			
[:RESult?]	PPEak | MPEak | MIDDle | RMS		query only
:AFRequency			
[:RESult?]			query only
:FERRor			
[:RESult?]			query only
:SINad			
[:STATe]	<Boolean>		
:RESult?			query only
:CARRier			
[:RESult?]			query only
:DDEMod			Vector Signal Analysis
:RESult?	MERM | MEPK | MEPS | PERM | PEPK | PEPS |EVRM | EVPK | EVPS | IQOF | IQIM | ADR | FERR | DEV | FSRM | FSPK | FSPS | RHO |FEPK | DTTS		query only
:POWer			
:SELect	ACPower | CPOWer | OBANdwidth | OBWidth | CN | CN0		no query
:RESult?	ACPower | CPOWer | OBANdwidth | OBWidth | CN | CN0		query only
:PRESet	NADC | TETRA | PHS| PDC | CDPD | CDMA | NONE		
:CF!Lter	<Boolean>		
[:STATe]	OFF		no query
:SUMMary			
:MAXimum			Vector Signal Analysis
[:STATe]	<Boolean>		
:RESult?			query only
:PPEak			Vector Signal Analysis
[:STATe]	<Boolean>		
:RESult?			query only
:MPEak			Vector Signal Analysis
[:STATe]	<Boolean>		
:RESult?			query only
:MIDDle			Vector Signal Analysis
[:STATe]	<Boolean>		
:RESult?			query only
:RMS			
[:STATe]	<Boolean>		
:RESult?			query only
:MEAN			
[:STATe]	<Boolean>		
:RESult?			query only
:PHOLd	<Boolean>		
:AVERage	<Boolean>		
:AOFF			no query

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2>			
:MARKer			
:FUNCtion			
:CENTer			no query
:CSTep			no query
:STARt			no query
:STOP			no query
:MSTep			no query
:REFerence			no query

CALCulate<1|2>:MARKer<1 to 4>[:STATe]

This command switches on or off the currently selected marker. If no indication is made, marker 1 is selected automatically.

Syntax: CALCulate<1|2>:MARKer<1 to 4>[:STATe] ON | OFF

Example: "CALC:MARK3 ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:AOFF

This command switches off all active markers.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:AOFF

Example: "CALC:MARK:AOFF"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:TRACe

This command assigns the selected marker (1 to 4) to the indicated test curve.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:TRACe <numeric value>
<numeric value> ::= 1 to 4

Example: "CALC:MARK3:TRAC 2"

Features: *RST value -
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:X

This command positions the selected marker to the indicated frequency (span > 0) or time (span = 0).

Syntax: CALCulate<1|2>:MARKer<1 to 4>:X <numeric value>
<numeric value> ::= 0 to MAX (frequency) | MAX (sweep time)

Example: "CALC:MARK:X 10.7MHz"

Features: *RST value: -
SCPI: device-specific

The unit SYM is available in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:X:SLIMits[:STATe]

This command switches between a limited (ON) and unlimited (OFF) search range.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:X:SLIMits[STATe] ON | OFF

Example: "CALC:MARK:X:SLIM ON"

features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:COUNt

This command switches on or off the frequency counter at the marker position.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:COUNt ON|OFF

Example: "CALC:MARK:COUN ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:COUNt:RESolution

This command specifies the resolution of the frequency counter.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:COUNt:RESolution <numeric value>
<numeric value> ::= 0.1 | 1 | 10 | 100 | 1000 | 10000 Hz

Example: "CALC:MARK:COUN:RES 1kHz"

Features: *RST value: 1kHz
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:COUNt:FREQuency

This command queries the result of the frequency counter.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:COUNt:FREQuency?

Example: "CALC:MARK:COUN:FREQ?"

Features: *RST value: -
SCPI: device-specific

This command is only a query and thus has no *RST value.

CALCulate<1|2>:MARKer<1 to 4>:COUPled[:STATe]

This command switches the coupling of markers on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:COUPling[:STATe] ON | OFF

Example: "CALC:MARK:COUP ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:LOEXclude

This command switches the local oscillator suppression on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:LOEXclude ON | OFF

Example: "CALC:MARK:LOEX ON"

Features: *RST value: OFF
SCPI: device-specific

The numeric suffixes 1|2 and 1 to 4 are not significant.

CALCulate<1|2>:MARKer<1 to 4>:Y?

This command queries the selected marker value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:Y?

Example: "CALC:MARK:Y?"

Features: *RST value: -
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:MAXimum[:PEAK]

This command positions the marker to the current maximum value in the trace memory.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MAXimum[:PEAK]

Example: "CALC:MARK:MAX"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MAXimum:APEak

This command positions the marker to the maximum absolute value of the trace.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MAXimum:APEak

Example: "CALC:MARK:MAX:APE"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MAXimum:NEXT

This command positions the marker to the next lower maximum value in the trace memory.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MAXimum:NEXT

Example: "CALC:MARK:MAX:NEXT"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MAXimum:RIGHt

This command positions the marker to the next smaller maximum value to the right of the current value (i.e., in ascending X direction) in the trace memory.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MAXimum:RIGHt

Example: "CALC:MARK:MAX:RIGH"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MAXimum:LEFT

This command positions the marker to the next smaller maximum value to the left of the current value (i.e., in descending X direction) in the trace memory.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MAXimum:LEFT

Example: "CALC:MARK:MAX:LEFT"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MINimum[:PEAK]

This command positions the marker to the current minimum value in the trace memory.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MINimum[:PEAK]

Example: "CALC:MARK:MIN"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MINimum:NEXT

This command positions the marker to the next higher minimum value in the trace memory.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MINimum:NEXT

Example: "CALC:MARK:MIN:NEXT"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MINimum:RIGHt

This command positions the marker to the next higher minimum value to the right of the current value (ie in ascending X direction).

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MINimum:RIGHt

Example: "CALC:MARK:MIN:RIGH"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:MINimum:LEFT

This command positions the marker to the next higher minimum value to the left of the current value (ie in descending X direction).

Syntax: CALCulate<1|2>:MARKer<1 to 4>:MINimum:LEFT

Example: "CALC:MARK:MIN:LEFT"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:STEP[:INCRement]

This command defines the marker step width.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:STEP[:INCRement] <numeric_value>

Example: "CALC:MARK:STEP 10kHz" (frequency domain)
"CALC:MARK:STEP 5ms" (time domain)
"CALC:MARK:STEP 20SYM" (time domain)

Features: *RST value: - (STEP is set to AUTO)
SCPI: device-specific

This command sets STEP:AUTO to OFF.

CALCulate<1|2>:MARKer<1 to 4>:STEP:AUTO

This command switches the automatic adaptation of the marker step width on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:STEP:AUTO ON | OFF

Example: "CALC:MARK:STEP:AUTO OFF"

Features: *RST value: ON
SCPI: device-specific

With AUTO ON, the step width is 10% of the span.

CALCulate<1|2>:MARKer<1 to 4>:PEXCursion

This command defines the peak excursion.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:PEXCursion <numeric_value>

Example: "CALC:MARK:PEXC 10dB"

Features: *RST value: 6dB
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:READout

This command determines the type of the marker display.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:READout MPHase | RIMaginary

Example: "CALC:MARK:READ RIM"

Features: *RST value: -
SCPI: device-specific

This command is only valid in operating mode Vector Signal Analysis (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown

This command defines the "N dB Down" value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown <numeric_value>

Example: "CALC:MARK:FUNC:NDBD 3dB"

Features: *RST value: 6dB
SCPI: device-specific

The temporary markers T1 and T2 are positioned by n dB below the active reference marker. The frequency spacing of these markers can be queried with CALCulate:MARKer:FUNCtion:NDBDown:RESult?.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown:STATe

This command switches the "N dB Down" function on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown:STATe ON | OFF

Example: "CALC:MARK:FUNC:NDBD:STAT ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown:RESult?

This command queries the frequency spacing (bandwidth) of the "N dB Down" markers.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown:RESult?

Example: "CALC:MARK:FUNC:NDBD:RES?"

Features: *RST value: -
SCPI: device-specific

This command is only a query which is why it is not assigned an *RST value.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown:FREQuency?

This command queries the frequencies of the "N dB Down" marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NDBDown:FREQuency?

Example: "CALC:MARK:FUNC:NDBD:FREQ?"

Features: *RST value: -
SCPI: device-specific

The two frequency values are separated by comma and indicated in ascending order. This command is only a query which is why it is not assigned an *RST value.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ZOOM

This command defines the range to be enlarged around the active marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ZOOM <numeric_value>

Example: "CALC:MARK:FUNC:ZOOM 1kHz"

Features: *RST value: -
SCPI: device-specific

The subsequent frequency sweep is stopped at the marker position and the frequency of the signal is counted. This frequency becomes the new center frequency, the zoomed span is then set. This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NOISe[:STATe]

This command switches the noise measurement on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NOISe[:STATe]ON | OFF

Example: "CALC:MARK:FUNC:NOIS ON"

Features: *RST value: OFF
SCPI: device-specific

The noise power density is measured at the position of the markers. The result can be queried with CALCulate:MARKer:FUNCtion:NOISe:RESult?.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NOISe:RESult?

This command queries the result of the noise measurement.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:NOISe:RESult?

Example: "CALC:MARK:FUNC:NOIS:RES?"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DEModulation:SELect

This command selects the demodulation type.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DEModulation:SELect AM | FM

Example: "CALC:MARK:FUNC:DEM:SEL FM"

Features: *RST value: AM
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DEModulation[:STATe]

This command switches the demodulation on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DEModulation[:STATe] ON | OFF

Example: "CALC:MARK:FUNC:DEM ON"

Features: *RST value: OFF
SCPI: device-specific

With demodulation switched on, the frequency sweep is stopped at the marker position and the signal is demodulated during the given stop time.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DEModulation:HOLDoff

This command defines the duration of the stop time for the demodulation.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DEModulation:HOLDoff
<num_value>
<numeric_value>::= 10ms to 1000s

Example: "CALC:MARK:FUNC:DEM:HOLD 3s"

Features: *RST value: - (DEModulation is set to OFF)
SCPI: device-specific

With demodulation switched on, the frequency sweep is stopped at the marker position and the signal is demodulated during the given stop time.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor

This command defines the shape factor measurement 60dB/6dB or 60dB/3dB.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor
<expr>::=(60dB/3dB) | (60dB/6dB)

Example: "CALC:MARK:FUNC:SFAC (60dB/3dB)"

Features: *RST value: (60dB/6dB)
SCPI: device-specific

The temporary markers T1 to T4 are positioned in pairs by 60dB and by 3dB or 6dB below the active reference marker. The frequency spacing ratio of these markers - the shape factor - can be queried with CALCulate:MARKer:FUNCtion:SFACtor:RESult?.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor:STATe

This command switches the shape factor measurement on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor:STATe ON | OFF

Example: "CALC:MARK:FUNC:SFAC:STAT ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor:RESult?

This command queries the result of the shape factor measurement.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor:RESult?

Example: "CALC:MARK:FUNC:SFAC:RES?"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor:FREQuency?

This command queries the frequencies of the shape factor measurement.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SFACtor:FREQuency?

Example: "CALC:MARK:FUNC:SFAC:FREQ?"

Features: *RST value: -
SCPI: device-specific

Four frequency values (at -60 dB, -6 or. -3 dB, -6 or -3 dB, -60dB) are indicated in ascending order. They are separated by a comma. This command is only a query which is why it is not assigned an *RST value.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:STRack[:STATe]

This command switches the signal-track function on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:STRack[:STATe] ON | OFF

Example: "CALC:MARK:FUNC:STR ON"

Features: *RST value: OFF
SCPI: device-specific

With SIGNAL TRACK function activated, the maximum signal is determined after each frequency sweep and the center frequency of this signal is set. With drifting signals the center frequency follows the signal.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:AM[:RESult?]

This command queries the results of the AM modulation measurement of the analog demodulation.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:AM[:RESult?]
PPEak | MPEak | MIDDle | RMS

Example: "CALC:MARK:FUNC:ADEM:AM? PPE"

Features: *RST value: -
SCPI: device-specific

This command is valid only in conjunction with the option Vector Signal Analysis (FSE-B7) and in the analog demodulation mode.

PPEak Result of the measurement with detector +PK
MPEak Result of the measurement with detector -PK
MIDDle Result of averaging ±PK/2
RMS Result of the measurement with detector RMS

In the modulation modes FM or PM query of the MIDDle-result is possible only.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:FM[:RESult?]

This command queries the results of the FM modulation measurement of the analog demodulation.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:FM[:RESult?]
PPEak | MPEak | MIDDle | RMS | RDEV

Example: "CALC:MARK:FUNC:ADEM:FM? PPE"

Features: *RST value: -
SCPI: device-specific

This command is valid only in conjunction with the option Vector Signal Analysis (FSE-B7) and in the analog demodulation mode.

PPEak Result of the measurement with detector +PK
MPEak Result of the measurement with detector -PK
MIDDle Result of averaging ±PK/2
RMS Result of the measurement with detector RMS

In the modulation modes FM or PM query of the MIDDle-result is possible only.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:PM[:RESult?]

This command queries the results of the PM modulation measurement of the analog demodulation.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:PM[:RESult?]
PPEak | MPEak | MIDDle | RMS

Example: "CALC:MARK:FUNC:ADEM:PM? PPE"

Features: *RST value: -
SCPI: device-specific

This command is valid only in conjunction with the option Vector Signal Analysis (FSE-B7) and in the analog demodulation mode.

PPEak Result of the measurement with detector +PK
MPEak Result of the measurement with detector -PK
MIDDle Result of averaging ±PK/2
RMS Result of the measurement with detector RMS

In the modulation modes FM or PM query of the MIDDle-result is possible only.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:AFRequency[:RESult?]

This command queries the audio frequency of the analog demodulation.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:AFRequency[:RESult?]

Example: "CALC:MARK:FUNC:ADEM:AFR? "

Features: *RST value: -
SCPI: device-specific

This command is valid only in conjunction with the option Vector Signal Analysis (FSE-B7) and in the analog demodulation mode.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:FERRor[:RESult?]

This command queries the frequency error of the analog demodulation.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:FERRor [:RESult?]

Example: "CALC:MARK:FUNC:ADEM:FERR? "

Features: *RST value: -
SCPI: device-specific

This command is valid only in conjunction with the option Vector Signal Analysis (FSE-B7) and in the analog demodulation mode.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:CARRier[:RESult?]

This command queries the results of the carrier frequency measurement.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:CARRier[:RESult?]

Example: "CALC:MARK:FUNC:ADEM:CARR?"

Features: *RST value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned. It is valid only in the analog demodulation mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:SINad[:STATe]

This command switches the SINAD measurement on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:SINad[:STATe]
ON | OFF

Example: "CALC:MARK:FUNC:ADEM:SIN ON"

Features: *RST value: OFF
SCPI: device-specific

This command is valid only in the analog demodulation mode (option FSE-B7) with Real Time ON.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:SINad:RESult?

This command queries the results of the SINAD measurement.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:ADEMod:SINad:RESult?

Example: "CALC:MARK:FUNC:ADEM:SIN:RES?"

Features: *RST value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned. It is valid only in the analog demodulation mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DDEMod:RESult?

This command queries the error measurement results of digital demodulation.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:DDEMod:RESult?
MERM | MEPK | MEPS | PERM | PEPK | PEPS |
EVRM | EVPK | EVPS | IQOF | IQIM | ADR | FERR | RHO

Example: "CALC:MARK:FUNC:DDEM:RES? EVRM"

Features: *RST value: -
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

MERM	magnitude error in %rms	FERR	frequency error in Hz
MEPK	maximum of magnitude error in %pk	FEPK	maximum of frequency error in Hz
MEPS	symbol number by which the maximum of the magnitude error occurred	ADR	amplitude drop in dB/symbol
PERM	phase error in deg	RHO	Rho-Factor
PEPK	maximum of phase error in deg	DEV	FSK deviation in Hz
PEPS	symbol number by which the maximum of the phase error occurred		
EVRM	vector error in %rms	FSPK	maximum of FSK deviation error in Hz
EVPK	maximum of vector error in %pk	FSRM	FSK deviation error in Hz
EVPS	symbol number by which the maximum of the vector error occurred	FSPS	symbol number by which the maximum of error occurred
IQOF	I/Q-offset error in %	DTTS	trigger delay of synchronization
IQIM	I/Q Imbalance in %		

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:SELect

This command selects the power measurement and switches it on.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:SELect
ACPower | CPOWer | OBANdwidth | OBWidth | CN | CN0

Example: "CALC:MARK:FUNC:POW:SEL ACP"

Features: *RST value: -
SCPI: device-specific

ACPower	adjacent channel power measurement
CPOWer	channel power measurement
OBANdwidth | OBWidth	occupied bandwidth power measurement
CN	signal / noise power measurement
CN0	signal-/ noise power measurement based on 1Hz bandwidth

This command is an event which is why it is not assigned an *RST value and query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:RESult?

This command queries the results of the power measurement (see also CALCulate:MARKer:FUNCtion:POWer:SELect.)

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:RESult?
ACPower | CPOWer | OBANdwidth | OBWidth | CN | CN0

Example: "CALC:MARK:FUNC:POW:RES? OBW"

Features: *RST value: -
SCPI: device-specific

This command is only a query which is why it is not assigned an *RST value.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer[:STATe]

This command switches the power measurement off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer[:STATe] OFF

Example: "CALC:MARK:FUNC:POW OFF"

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:PRESet

This command selects the settings for power measurement of standard NADC or of standard TETRA.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:PRESet
NADC | TETRA | PDC | PHS | CDPD | CDMA | NONE

Example: "CALC:MARK:FUNC:POW:PRES NADC"

Features: *RST value: -
SCPI: device-specific

The selection of a standard influences the parameters weighting filter, channel bandwidth and spacing, resolution and video bandwidth, as well as detector and sweep time.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:CFILter

This command switches the weighting filter for the selected standard on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:POWer:CFILter ON | OFF

Example: "CALC:MARK:FUNC:POW:CFIL ON"

Features: *RST value: OFF
SCPI: device-specific

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MAXimum[:STATe]

This command switches on or off the measurement of the maximum of the absolute value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MAXimum[:STATe]
ON | OFF

Example: "CALC:MARK:FUNC:SUMM:MAX ON"

Features: *RST value: OFF
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MAXimum:RESult?

This command queries the results of the measurement of the maximum of the absolute value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MAXimum:RESult?

Example: "CALC:MARK:FUNC:SUMM:MAX:RES?"

Features: *RST value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned. It is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:PPEak[:STATe]

This command switches on or off the measurement of the positive peak value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:PPEak[:STATe]
ON | OFF

Example: "CALC:MARK:FUNC:SUMM:PPE ON"

Features: *RST value: OFF
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:PPEak:RESult?

This command queries the result of the measurement of the positive peak value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:PPEak:RESult?

Example: "CALC:MARK:FUNC:SUMM:PPE:RES?"

Features: *RST value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned. It is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MPEak[:STATe]

This command switches on or off the measurement of the negative peak value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MPEak[:STATe]
ON | OFF

Example: "CALC:MARK:FUNC:SUMM:MPE ON"

Features: *RST value: OFF
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MPEak:RESult?

This command queries the result of the measurement of the negative peak value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MPEak:RESult?

Example: "CALC:MARK:FUNC:SUMM:MPE:RES?"

Features: *RST- value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned. It is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MIDDle[:STATe]

This command switches on or off the measurement of the arithmetical mean between positive and negative peak value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MIDDle[:STATe] ON | OFF

Example: "CALC:MARK:FUNC:SUMM:MIDD ON"

Features: *RST value: OFF
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MIDDle:RESult?

This command queries the result of the measurement of the arithmetical mean between positive and negative peak value.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MIDDle:RESult?

Example: "CALC:MARK:FUNC:SUMM:MIDD:RES? "

Features: *RST- value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned. It is available only in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:RMS[:STATe]

This command switches on or off the measurement of the effective (rms) value of the total trace.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:RMS[:STATe] ON | OFF

Example: "CALC:MARK:FUNC:SUM:RMS ON"

Features: *RST value: OFF
SCPI: device-specific

This command is valid at zero span or in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:RMS:RESult?

This command queries the results of the rms value measurement.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:RMS:RESult?

Example: "CALC:MARK:FUNC:SUM:RMS:RES?"

Features: *RST value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MEAN[:STATe]

This command switches on or off the measurement of the mean value of the total trace.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MEAN[:STATe] ON | OFF

Example: "CALC:MARK:FUNC:SUMM:MEAN ON"

Features: *RST value: OFF
SCPI: device-specific

This command is valid at zero span or in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MEAN:RESult?

This command queries the result of the measurement of the mean value of the total trace.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:MEAN:RESult?

Example: "CALC:MARK:FUNC:SUMM:MEAN:RES?"

Features: *RST- value: -
SCPI: device-specific

This command is only a query and thus has no *RST value assigned.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:PHOLd

This command switches on or off the peak-hold function.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:PHOLd ON | OFF

Example: "CALC:MARK:FUNC:SUMM:PHOL ON"

Features: *RST value: OFF
SCPI: device-specific

The peak-hold function is reset by switching off and on, again. This command is valid at zero span or in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:AVERage

This command switches the calculation of the average value on or off.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:AVERage ON | OFF

Example: "CALC:MARK:FUNC:SUMM:AVER ON"

Features: *RST value: OFF
SCPI: device-specific

The calculation of the average is reset by switching off and on, again. This command is valid at zero span or in the vector signal analysis mode (option FSE-B7).

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:AOFF

This command switches off all measuring functions.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:SUMMary:AOFF

Example: "CALC:MARK:FUNC:SUMM:AOFF"

Features: *RST value: _
SCPI: device-specific

This command is an "event" and therefore has no *RST value assigned and no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:CENTer

This command sets the center frequency to that of the current marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:CENTer

Example: "CALC:MARK:FUNC:CENT"

Features: *RST value: -
SCPI: device-specific

This command is an "event" and therefore has no *RST value assigned and no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:CSTep

This command sets the step width of the center frequency to the x-value of the current marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:CSTep

Example: "CALC:MARK:FUNC:CST"

Features: *RST value: -
SCPI: device-specific

This command is an "event" and therefore has no *RST value assigned and no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:STARt

This command sets the start frequency to the frequency of the current marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:STARt

Example: "CALC:MARK:FUNC:STAR"

Features: *RST value: -
SCPI: device-specific

This command is an "event" which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:STOP

This command sets the stop frequency to the frequency of the current marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:STOP

Example: "CALC:MARK:FUNC:STOP"

Features: *RST value: -
SCPI: device-specific

This command is an "event" which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:MSTep

This command sets the marker step width to the x-value of the current marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:MSTep

Example: "CALC:MARK:FUNC:MST"

Features: *RST value: -
SCPI: device-specific

This command is an "event" which is why it is not assigned an *RST value and has no query.

CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:REFerence

This command sets the reference level to that of the current marker.

Syntax: CALCulate<1|2>:MARKer<1 to 4>:FUNCtion:REFerence

Example: "CALC:MARK:FUNC:REF"

Features: *RST value: -
SCPI: device-specific

This command is an "event" and therefore has no *RST value assigned and no query.

3.6.4.7 CALCulate:MATH Subsystem

The CALCulate:MATH - subsystem allows to process data from the SENSe-subsystem in numeric expressions.

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2>			
:MATH<1 to 4>			
[:EXPRession]			
[:DEFine]	<expr>	--	
:STATe	<Boolean>	--	

CALCulate<1|2>:MATH<1 to 4>[:EXPression][:DEFine]

This command defines the mathematical expression for relating traces and reference line.

Syntax: CALCulate<1|2>:MATH<1 to 4> [:EXPRession][:DEFine]<expr>
<expr>::= 'OP1 - OP2 [+ RLINE]'
OP1 ::= TRACE1 | TRACE2 | TRACE3 | TRACE4
OP2 ::= TRACE1 | TRACE2 | TRACE3 | TRACE4 | RLINE

Examples:
```
"CALC:MATH1 (TRACE1 - TRACE3 + RLINE)"
"CALC:MATH4 (TRACE4 - RLINE)"
```

Features: *RST value: -
SCPI: conforming

The operand [+ RLINE] may be used only if OP2 is different from RLINE. The numeric suffix in CALCULATE<1|2> is not significant. The numeric suffix in MATH<1 to 4> denotes the trace where the result of the mathematical operation is stored. The number must be identical to the number of the operand OP1.

CALCulate<1|2>:MATH<1 to 4>:STATe

This command switches the mathematical relation of traces on or off.

Syntax: CALCulate<1|2>:MATH**<1 to 4>**:STATe ON | OFF

Example:
```
"CALC:MATH1:STAT ON"
```

Features: *RST value: OFF
SCPI: conforming

The numeric suffix in CALCULATE<1|2> is not significant. The numeric suffix in MATH<1 to 4> denotes the trace which the command refers to.

3.6.4.8 CALCulate:UNIT Subsystem

COMMAND	PARAMETERS	UNIT	COMMENT
CALCulate<1|2>			
:X			Vector Signal Analysis
:UNIT			
:TIME	S | SYM		
:UNIT			Vector Signal Analysis
:ANGLe	DEG | RAD		
:POWer	DBM | V | W | DB | PCT | UNITLESS | DBPW | WATT | DBUV | DBMV | VOLT | DBUA | AMPere DBUV_MHZ | DBMV_MHZ | DBUA_MHZ | DBUV_M | DBUA_M | DBUV_MMHZ | DBUA_MMHZ		

CALCulate<1\|2>:X:UNIT:TIME

This command selects seconds or symbols as an x-axis unit.

Syntax: CALCulate<1|2>:X:UNIT:TIME S | SYM

Example: "CALC:X:UNIT:TIME S"

Features: *RST value: _S
SCPI: device-specific

This command is only valid in vector signal analysis mode (option FSE-B7).

CALCulate<1\|2>: UNIT:ANGLe

This command selects the unit for angular measurement.

Syntax: CALCulate<1|2>:UNIT:ANGLe DEG | RAD

Example: "CALC:UNIT:ANGL DEG"

Features: *RST- value: _RAD
SCPI: device-specific

This command is only valid in vector signal analysis mode (option FSE-B7).

CALCulate<1|2>: UNIT:POWer

This command selects the unit for power.

Syntax: CALCulate<1|2>:UNIT:POWer DBM | V | W | DB |
PCT | UNITLESS |
DBPW | WATT |
DBUV | DBMV | VOLT |
DBUA | AMPere
DBUV_MHZ | DBMV_MHZ |
DBUA_MHZ | DBUV_M | DBUA_M |
DBUV_MMHZ | DBUA_MMHZ

Example: "CALC:UNIT:POW DBM"

Features: *RST value: _
SCPI: device-specific

This command is only valid in vector signal analysis mode (option FSE-B7).

3.6.5 CALibration Subsystem

The commands of the CALibration subsystem perform instrument calibrations.

COMMAND	PARAMETERS	UNIT	COMMENT
CALibration			
[:ALL]?	--	--	query only
:BANDwidth			
[:RESolution]?	--	--	query only
:BWIDth			
[:RESolution]?	--	--	query only
:IQ?	--	--	query only / Vector Signal Analysis
:LDETector?	--	--	query only
:LOSuppression?	--	--	query only
:PPEak?	--	--	query only FSEM/FSEK only
:SHORt?	--	--	query only
:STATe	<Boolean>	--	

CALibration[:ALL]?

This command performs a complete calibration of the analyzer. A "0" is returned if the calibration was successful.

Syntax: CALibration[:ALL]?

Example: `"CAL?"`

Features: *RST value: -
SCPI: conforming

CALibration:BANDwidth | BWIDth[:RESolution]?

This command performs a calibration of the filter bandwidths. A "0" is returned if the calibration was successful.

Syntax: CALibration:BANDwidth|BWIDth[:RESolution]?

Example: `"CAL:BAND?"`

Features: *RST value: -
SCPI: device-specific

CALibration:IQ?

This command performs a calibration of the vector signal analyzer. A "0" is returned if the calibration was successful.

Syntax: CALibration:IQ?

Example: `"CAL:IQ?"`

features: *RST value: -
SCPI: device-specific

This command is valid only when option Vector Signal Analysis FSE-B7 is fitted.

CALibration:LDETector?

This command performs a calibration of the log module's characteristic and of the detectors. A "0" is returned if the calibration was successful.

Syntax: CALibration:LDETector?

Example: "CAL:LDET?"

Features: *RST value: -
SCPI: device-specific

CALibration:LOSuppression?

This command performs a calibration of the local oscillator suppression. . A "0" is returned if the calibration was successful.

Syntax: CALibration:LOSuppression?

Example: "CAL:LOS?"

Features: *RST value: -
SCPI: device-specific

This command is only valid by model '30 instruments or by instruments which have been retrofitted.

CALibration:PPEak?

This command performs a calibration of the tracking YIG filter (preselector peaking). A "0" is returned if the calibration was successful.

Syntax: CALibration:PPEak?

Example: "CAL:PPE?"

Features: *RST value: -
SCPI: device-specific

This command is only valid by the models FSEM and FSEK.

CALibration:SHORt?

This command performs a short calibration. A "0" is returned if the calibration was successful.

Syntax: CALibration:SHORt?

Example: "CAL:SHOR?"

Features: *RST value: -
SCPI: device-specific

CALibration:STATe

This command determines whether (ON) or not (OFF) the current calibration data are taken into consideration.

Syntax: CALibration:STATe ON | OFF

Example: "CAL:STAT OFF"

Features: *RST value: -
SCPI: conforming

3.6.6 CONFigure Subsystem

The CONFigure subsystem contains commands for configuring complex measurement tasks, like those provided by the option GSM BTS Analyzer (FSE-K11). The CONFigure subsystem is closely linked to the functions of the FETCH and READ subsystems, where the measurement cycles are started and/or the results of the measurements are queried.

3.6.6.1 CONFigure:BTS Subsystem

This subsystem provides the commands for configuring the GSM BTS Analyzer mode (Option FSE-K11) for analyzing the behavior of base stations corresponding to the standards P-GSM, E-GSM, DCS1800 or PCS1900.

COMMAND	PARAMETERS	UNIT	COMMENT
CONFigure			
:BTS			Option FSE-K11
:ARFCn	<numeric_value>	--	
:AUTO	ONCE		
:POWer			
:CLASs	<numeric_value> | M1 | M2 | M3	--	
:STATic	<numeric_value>	--	
:DYNamic	<numeric_value>	--	
:EXPected	<numeric_value>	DBM	
:CHANnel			
:SLOT	<numeric_value>	--	
:AUTO	ONCE		
:TSC	<numeric_value>	--	
:AUTO	<Boolean>		
:SFH	<Boolean>		
:NETWork			
[:TYPE]	PGSM | EGSM | DCS | PCS		
:PHASe	1|2		
:COSiting	<Boolean>		
:TXSupp	<Boolean>		
:PRESet	--		

CONFigure:BTS:ARFCn

This command selects the number of the transmission channel of the base station.

Syntax: CONFigure:BTS:ARFCn <numeric_value>

<numeric_value>::= 1 to 124 (P-GSM phase I/II)
0 to 124, 975 to 1023 (E-GSM)
512 to 885 (DCS1800 phase I/II)
512 to 810 (PCS1900)

Example: "CONF:BTS:ARFC 67"

Features: *RST value: 1 (P-GSM phase I/II)
0 (E-GSM)
512 (DCS1800 phase I/II)
512 (PCS1900)
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:ARFCn:AUTO

This command is used to search for the channel number of the transmission channel of the base station automatically. This requires only one channel to be active.

Syntax: CONFigure:BTS:ARFCn:AUTO ONCE

Example: "CONF:BTS:ARFC:AUTO ONCE"

Features: *RST value: --
SCPI: device-specific

This command is an event and thus has no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:POWer:CLASs

This command defines the power class of the base station.

Syntax: CONFigure:BTS:POWer:CLASs <numeric_value> | M1 | M2 | M3
<numeric_value> ::= 1 to 8 (P-GSM phase I/II, E-GSM, DCS1800 phase I/II)
::= 1 to 4 (PCS1900)
M1, M2, M3 ::= Power Classes for Micro BTS

Example: "CONF:BTS:POW:CLAS 4"

Features: *RST value: 4 (P-GSM phase I/II, E-GSM)
1 (DCS1800, PCS1900)
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:POWer:STATic

This command defines the static power control level of the base station.

Syntax: CONFigure:BTS:POWer:STATic <numeric_value>
<numeric_value>::= 0 to 6

Example: "CONF:BTS:POW:STAT 3"

Features: *RST value: 0
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:POWer:DYNamic

This command defines the dynamic power control level of the base station.

Syntax: CONFigure:BTS:POWer:DYNamic <numeric_value>
<numeric_value>::= 0 to 15

Example: "CONF:BTS:POW:DYN 5"

Features: *RST value: 0
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:POWer:EXPected

This command enters directly the rated output level of the base station specified by the manufacturer.

Syntax: CONFigure:BTS:POWer:EXPected <numeric_value>

Example: "CONF:BTS:POW:EXP 43DBM"

Features: *RST value: 46 dBm (P-GSM phase I/II, E-GSM)
43 dBm (DCS1800, PCS1900)
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:CHANnel:SLOT

This command selects the slot number within a transmission frame of the base station.

Syntax: CONFigure:BTS:CHANnel:SLOT <numeric_value>
<numeric_value> ::= 0 to 7

Example: "CONF:BTS:CHAN:SLOT 3"

Features: *RST value: 0
SCPI: device-specific

On changing the slot number, the number of the midamble (TSC) is automatically adapted to the slot. This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:CHANnel:SLOT:AUTO

This command automatically searches for the slot number within a transmission frame of the base station. This requires only one slot to be active.

Syntax: CONFigure:BTS:CHANnel:SLOT:AUTO ONCE

Example: "CONF:BTS:CHAN:SLOT:AUTO ONCE"

Features: *RST value: --
SCPI: device-specific

This command is an event and thus has no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:CHANnel:SFH

This command defines whether the base station uses slow frequency hopping or not.

Syntax: CONFigure:BTS:CHANnel:SFH ON | OFF

Example: "CONF:BTS:CHAN:SFH ON"

Features: *RST value: OFF
SCPI: device-specific

This command is available only when spurious or transient spectrum measurement is selected. The settings for spurious measurement are independent from those selected for transient spectrum. Moreover, this command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:CHANnel:TSC:AUTO

This command couples the midamble (training sequence TSC_0 to 7) to the slot, i.e. if the slot number is changed the training sequence in the ON state is automatically adapted. In the OFF state, the training sequence set is conserved even if the slot number is changed.

Syntax: CONFigure:BTS:CHANnel:TSC:AUTO ON | OFF

Example: "CONF:BTS:CHAN:TSC:AUTO ON"

Features: *RST value: ON
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:CHANnel:TSC

This command selects the midamble (training sequence TSC_0 to 7) of the active slot.

Syntax: CONFigure:BTS:CHANnel:TSC <numeric_value>
<numeric_value> ::= 0 to 7

Example: "CONF:BTS:CHAN:TSC 3"

Features: *RST value: 0
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:NETWork[:TYPE]

This command selects the standard type according to which the base station will work.

Syntax: CONFigure:BTS:NETWork[:TYPE]PGSM | EGSM | DCS | PCS

Example: "CONF:BTS:NETW DCS"

Features: *RST value: GSM
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:NETWork:PHASe

This command selects the phase of the standard according to which the base station will work.

Syntax: CONFigure:BTS:NETWork:PHASe1|2

Example: "CONF:BTS:NETW:PHAS 2"

Features: *RST value: 1
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:COSiting

This command selects whether the base station has the "cositing" feature.

Syntax: CONFigure:BTS:COSiting ON | OFF

Example: "CONF:BTS:COSiting ON"

Features: *RST value: OFF
SCPI: device-specific

This command is available only if spurious emission measurement is selected. Moreover, it is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:TXSupp

This command defines that an additional carrier suppression of min. 20dB is taken into account for the measurement. If there is already suppression, a more sensitive setting of the instrument is selected.

Syntax: CONFigure:BTS:TXSupp ON | OFF

Example: "CONF:BTS:TXSupp ON"

Features: *RST value: OFF
SCPI: device-specific

For measurements in the RX-band the value is automatically set to ON. This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:BTS:PRESet

This command resets the parameters for the standard selected to their default values (DEFAULT SETTINGS).

Syntax: CONFigure:BTS:PRESet

Example: "CONF:BTS:PRES"

Features: *RST value: --
SCPI: device-specific

This command is an event and has thus no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

3.6.6.2 CONFigure:BURSt Subsystem

This subsystem provides the commands for configuring the measurements in the GSM BTS Analyzer mode (option FSE-K11) or GSM MS Analyzer mode (option FSE-K10) which are performed on individual bursts. (carrier power, phase/frequency error, power vs. time).

COMMAND	PARAMETERS	UNIT	COMMENT
CONFigure			
:BURSt			
:PFERror			Option FSE-K11&FSE-B7 or FSE-K10&FSE-B7
[:IMMediate]	--	--	
:COUNt	<numeric_value>	--	
:POWer			
[:IMMediate]	--	--	Option FSE-K11 or FSE-K10
:COUNt	<numeric_value>	--	
:CONDition	NORMal | EXTReme		
:PTEMplate			
[:IMMediate]	--	--	Option FSE-K11 or FSE-K10
:COUNt	<numeric_value>	--	
:SELect	FULL | TOP | RISing | FALLing		

CONFigure:BURSt:PFERror[:IMMediate]

This command selects measurement of the phase and frequency error of the base station or mobile.

Syntax: CONFigure: BURSt:PFERror[:IMMediate]

Example: "CONF:BURST:PFER"

Features: *RST value: --
SCPI: device-specific

This command is an event and thus has no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer FSE-K11 and Vector Signal Analysis FSE-B7 or in conjunction with option GSM MS Analyzer, FSE-K10, and Vector Signal Analysis, FSE-B7.

CONFigure:BURSt:PFERror:COUNt

This command sets the number of bursts used for the determination of average and maximum value.

Syntax: CONFigure: BURSt:PFERror:COUNt <numeric_value>
<numeric_value>::= 1 to 1000

Example: "CONF:BURST:PFER:COUN 100"

Features: *RST value: 500 (GSM/DCS1800 Phase I)
200 otherwise
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer FSE-K11 or GSM MS Analyzer FSE-K10 and Vector Signal Analysis FSE-B7.

CONFigure:BURSt:POWer[:IMMediate]

This command selects measurement of the average carrier power of the base station or mobile.

Syntax: CONFigure: BURSt:POWer[:IMMediate]

Example: "CONF:BURST:POW"

Features: *RST value: --
SCPI: device-specific

This command is an event and thus has no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:BURSt:POWer:COUNt

This command sets the number of bursts used for the determination of measured values.

Syntax: CONFigure: BURSt:POWer:COUNt <numeric_value>
<numeric_value>::= 1 to 1000

Example: "CONF:BURST:POW:COUN 100"

Features: *RST value: 500 (GSM/DCS1800 phase I)
200 otherwise
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:BURSt:POWer:CONDition

This command defines the conditions for power measurement.

Syntax: CONFigure: BURSt:POWer:CONDition NORMal | EXTReme

Example: "CONF:BURST:POW:COND EXTR"

Features: *RST value: NORMal
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:BURSt:PTEMplate[:IMMediate]

This command selects measurement of power of the base station or mobile vs. time.

Syntax: CONFigure: BURSt:PTEMplate[:IMMediate]

Example: "CONF:BURST:PTEM"

Features: *RST value: --
SCPI: device-specific

This command is an event and thus has no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:BURSt:PTEMPlate:COUNt

This command defines the number of bursts used for determining the measured value.

Syntax: CONFigure: BURSt:PTEMplate:COUNt <numeric_value>
<numeric_value>::= 1 to 1000

Example: "CONF:BURS:PTEM:COUN 100"

Features: *RST value: 500 (GSM/DCS1800 phase I)
200 otherwise
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:BURSt:PTEMplate:SELect

This command defined the burst section to be measured.

Syntax: CONFigure: BURSt:PTEMplate:SELect FULL | TOP | RISing | FALLing

Example: "CONF:BURS:PTEM:SEL TOP"

Features: *RST value: FULL
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

3.6.6.3 CONFigure:MS Subsystem

This subsystem provides the commands for configuring the GSM MS Analyzer mode (Option FSE-K10) for analyzing the behavior of mobiles corresponding to the standards P-GSM, E-GSM, DCS1800 or PCS1900.

COMMAND	PARAMETERS	UNIT	COMMENT
CONFigure			
:MS			Option FSE-K10
:ARFCn	<numeric_value>	--	
:AUTO	ONCE		
:POWer			
:CLASs	<numeric_value>	--	
:LEVel	<numeric_value>	--	
:EXPected	<numeric_value>	DBM	
:CHANnel			
:TSC	0 to 7 | AB	--	
:NETWork			
[:TYPE]	PGSM | EGSM | DCS | PCS		
:PHASe	1|2		
:TXSupp	<Boolean>		
:PRESet	--		

CONFigure:MS:ARFCn

This command selects the number of the transmission channel of the mobile.

Syntax: CONFigure:MS:ARFCn <numeric_value>

<numeric_value>::= 1 to 124 (P-GSM phase I/II)
0 to 124, 975 to 1023 (E-GSM)
512 to 885 (DCS1800 phase I/II)
512 to 810 (PCS1900)

Example: "CONF:MS:ARFC 67"

Features: *RST value: 1 (P-GSM phase I/II)
0 (E-GSM)
512 (DCS1800 phase I/II)
512 (PCS1900)
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:ARFCn:AUTO

This command selects automatically the transmission channel of the mobile.

Syntax: CONFigure:MS:ARFCn:AUTO ONCE

Example: "CONF:MS:ARFC:AUTO ONCE"

Features: *RST value: -
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:POWer:CLASs

This command defines the power class of the mobile.

Syntax: CONFigure:MS:POWer:CLASs <numeric_value>
<numeric_value> ::= 1 to 5 (P-GSM phase I)
2 to 5 (P-GSM phase II)
2 to 5 (E-GSM)
1 to 2 (DCS1800 phase I)
1 to 3 (DCS1800 phase II)
1 to 3 (PCS1900)

Example: "CONF:MS:POW:CLAS 4"

Features: *RST value: 2 (P-GSM phase I/II, E-GSM)
1 (DCS1800, PCS1900)
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:POWer:LEVel

This command defines the power control level of the mobile.

Syntax: CONFigure:MS:POWer:LEVel <numeric_value>
<numeric_value>::= 0 to 6

Example: "CONF:MS:POW:LEV 3"

Features: *RST value: 0
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:POWer:EXPected

This command enters directly the rated output level of the mobile.

Syntax: CONFigure:MS:POWer:EXPected <numeric_value>

Example: "CONF:MS:POW:EXP 43DBM"

Features: *RST value: 46 dBm (P-GSM phase I/II, E-GSM)
43 dBm (DCS1800, PCS1900)
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:CHANnel:TSC

This command selects the midamble used by the mobile.

Syntax: CONFigure:MS:CHANnel:TSC <numeric_value> | AB
<numeric_value> ::= 0 to 7 (training sequence for the Normal Burst)
AB (training sequence for the Access Burst)

Example: "CONF:MS:CHAN:TSC 3"

Features: *RST value: 0
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:NETWork[:TYPE]

This command selects the standard type according to which the mobile will work.

Syntax: CONFigure:MS:NETWork[:TYPE] PGSM | EGSM | DCS | PCS

Example: "CONF:MS:NETW DCS"

Features: *RST value: GSM
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:NETWork:PHASe

This command selects the phase of the standard according to which the mobile will work.

Syntax: CONFigure:MS:NETWork:PHASe 1 | 2

Example: "CONF:MS:NETW:PHAS 2"

Features: *RST value: 1
SCPI: device-specific

This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:TXSupp

This command defines that an additional carrier suppression of min. 20dB is taken into account for the measurement. If there is already suppression, a more sensitive setting of the instrument is selected.

Syntax: CONFigure:MS:TXSupp ON | OFF

Example: "CONF:MS:TXSupp ON"

Features: *RST value: OFF
SCPI: device-specific

For measurements in the RX-band the value is automatically set to ON. This command is available only in conjunction with option GSM MS Analyzer, FSE-K10.

CONFigure:MS:PRESet

This command resets the parameters for the standard selected to their default values (DEFAULT SETTINGS).

Syntax: CONFigure:MS:PRESet

Example: "CONF:MS:PRES"

Features: *RST value: --
SCPI: device-specific

This command is an event and has thus no query and no *RST value assigned. It is available only in conjunction with option GSM MS Analyzer, FSE-K10.

3.6.6.4 CONFigure:SPECtrum Subsystem

This subsystem provides the commands for configuring the measurements in the GSM BTS Analyzer mode (FSE-K11) or in the GSM MS Analyzer mode (FSE-K10) used to determine the power of the spectral contributions due to modulation and switching (modulation spectrum, transient spectrum).

COMMAND	PARAMETERS	UNIT	COMMENT
CONFigure			
:SPECtrum			Option FSE-K11 or FSE-K10
:MODulation			
[:IMMediate]	--	--	
:COUNt	<numeric_value>	--	
:RANGe	ARFCn | TXBand | RXBand | COMBined | DCSRx1800		
:SWITching			
[:IMMediate]	--	--	
:COUNt	<numeric_value>	--	

CONFigure:SPECtrum:MODulation[:IMMediate]

This command selects measurement of the spectrum due to modulation.

Syntax: CONFigure:SPECtrum:MODulation[:IMMediate]

Example: "CONF:SPEC:MOD"

Features: *RST value: --
SCPI: device-specific

This command is an event and has thus no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:SPECtrum:MODulation:COUNt

This command sets the number of bursts used for determining the average and maximum values.

Syntax: CONFigure:SPECtrum:MODulation:COUNt <numeric_value>
<numeric_value>::= 1 to 1000

Example: "CONF:SPEC:MOD:COUN 100"

Features: *RST value: 500 (GSM/DCS1800 phase I)
200 otherwise
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:SPECtrum:MODulation:RANGe

This command selects the frequency range for the measurement.

Syntax: CONFigure:SPECtrum:MODulation:RANGe ARFCn | TXBand | RXBand | COMBined | DCSRx1800
ARFCn::= ARFCN ± 1.8 MHz
TXBand::= TX-Band
RXBand::= RX-Band
COMBined::= ARFCN ± 1.8 MHz / TX-Band
DCSRx1800::= RX band DCS 1800 (option FSE-K10 only)

Example: "CONF:SPEC:MOD:RANG TXB"

Features: *RST value: ARFCn
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:SPECtrum:SWITching[:IMMediate]

This command selects measurement of the spectrum due to switching transients.

Syntax: CONFigure:SPECtrum:SWITching[:IMMediate]

Example: "CONF:SPEC:SWIT "

Features: *RST value: --
SCPI: device-specific

This command is an event and has thus no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:SPECtrum:SWITching:COUNt

This command defines the number of bursts used for determining the average and maximum values.

Syntax: CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
<numeric_value>::= 1 to 1000

Example: "CONF:SPEC:SWIT:COUN 100"

Features: *RST value: 500 (GSM/DCS1800 phase I)
200 otherwise
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

3.6.6.5 CONFigure:SPURious Subsystem

This subsystem provides commands for configuring the measurements in the GSM BTS (FSE-K11) or GSM MS (FSE-K10) Analyzer mode used for measuring the power of spurious emissions.

COMMAND	PARAMETERS	UNIT	COMMENT
CONFigure			
:SPURious			Option FSE-K11 or FSE-K10
[:IMMediate]	--	--	
:COUNt	<numeric_value>	--	
:RXBand	<numeric_value>	--	
:RANGe	TXBand | OTXBand | RXBand | IDLeband	--	

CONFigure:SPURious[:IMMediate]

This command selects measurement of spurious emissions.

Syntax: CONFigure:SPURious[:IMMediate]

Example: "CONF:SPUR"

Features: *RST value: --
SCPI: device-specific

This command is an event and has thus no query and no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

CONFigure:SPURious:COUNt

This command sets the number of bursts used for determining the average and maximum values.

Syntax: CONFigure:SPURious:COUNt <numeric_value>
<numeric_value>::= 1 to 1000

Example: "CONF:SPUR:COUN 100"

Features: *RST value: 500 (GSM/DCS1800 phase I)
200 otherwise
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.
The number of bursts in measurements of the RX band is set by command CONFigure:SPURious:RANGe:RXBand (FSE K11 only).

CONFigure:SPURious:COUNt:RXBand

This command ses the number of bursts used for determining the average and maximum values in measurements of the RX band.

Syntax: CONFigure:SPURious:COUNt:RXBand <numeric_value>
<numeric_value>::= 1 to 1000

Example: "CONF:SPUR:COUN:RXB 100"

Features: *RST value: 1
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11.

CONFigure:SPURious:RANGe

This command selects the frequency range used for the measurement.

Syntax: CONFigure:SPURious:RANGe TXBand | OTXBand | RXBand
TXBand::= TX-Band
OTXBand::= Not TX-Band
RXBand::= RX-Band (option FSE-K11 only)
IDLeband::= Idle band (option FSE-K10 only)

Example: "CONF:SPUR:RANG OTX"

Features: *RST value: TXB
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

3.6.7 DIAGnostic Subsystem

The DIAGnostic subsystem contains the commands which support instrument diagnostics for maintenance, service and repair. In accordance with the SCPI standard, all of these commands are device-specific.

COMMAND	PARAMETERS	UNIT	COMMENT
DIAGnostic			
:SERVice			
:INPut			
[:SELect]	CALibration | RF	--	
:FUNCtion	<numeric_value>,>numeric_value>	--	no query
:NSOurce	<Boolean>	--	

DIAGnostic:SERVice:INPut[:SELect]

This command toggles between the RF input on the front panel and the internal 120-MHz reference signal.

Syntax: DIAGnostic:SERVice:INPut[:SELect] CALibration|RF

Example: `"DIAG:SERV:INP CAL"`

Features: *RST value: RF
SCPI: device-specific

DIAGnostic:SERVice:FUNCtion

This command activates a service function.

Syntax: DIAGnostic:SERVice:FUNCtion <numeric_value>,<numeric_value>...

Example: `"DIAG:SERV:FUNC 2,0,2,12,1"`

Features: *RST value: -
SCPI: device-specific

The service function is selected via five parameters: functional group number, board number, function number, parameter 1 and parameter 2.

See service manual 1065.6016.24.

DIAGnostic:SERVice:NSOurce

This command switches the 28-V supply at the rear connector of the noise source on and off.

Syntax: DIAGnostic:SERVice:NSOurce ON | OFF

Example: `"DIAG:SERV:NSO ON"`

Features: *RST value: OFF
SCPI: device-specific

3.6.8 DISPlay Subsystem

The DISPLay subsystem controls the selection and presentation of textual and graphic information as well as of trace data on the display.
The displays in the split-screen mode are assigned to WINDow 1 (screen A) or 2 (screen B) .

COMMAND	PARAMETERS	UNIT	COMMENT
DISPlay			
:FORMat	SINGle | SPLit		
:PROgram			
[:MODE]	<Boolean>		option FSE-B15
:ANNotation			
:FREQuency	<Boolean>		
:LOGO	<Boolean>		
:CMAP<1 to 13>			
:DEFault			
:HSL	0 to 1,0 to 1,0 to 1		
:PDEFined	BLACk | BLUE | BROWn | GREen | CYAN | RED | MAGenta | YELLow | WHITe | DGRAy | LGRAy | LBLUe | LGREen | LCYan | LRED | LMAGenta		
[:WINDow<1|2>]			
:TEXT			
[:DATA]	<string>		
:STATe	<Boolean>		
:TIME	<Boolean>		
:MINFo	<Boolean>		
:TRACe<1 to 4>			
:X			
[:SCALe]			Vector Signal Analysis
:RVALue	<numeric_value>		
:ZOOM	<Boolean>		
[:FREQuency]			
:STARt	<numeric_value>	HZ	
:STOP	<numeric_value>	HZ	
:CENTer	<numeric_value>	HZ	
:Y			
[:SCALe]	<numeric_value>	DB	
:MODE	ABSolute | RELative		
:RLEVel	<numeric_value>	DBM	
:OFFSet	<numeric_value>	DB	
:RVALue	<numeric_value>	DBM|DB|HZ|DEG|RAD	Vector Signal Analysis
:AUTO	<Boolean>		Analyzer mode only
:RPOSition	<numeric_value>	PCT	Vector Signal Analysis
:PDIVision	<numeric_value>	DBM|DB|HZ|DEG|RAD	Vector Signal Analysis
:SPACing	LINear|LOGarithmic|PERCent	--	
:MODE	WRITe | VIEW | AVERage | MAXHold | MINHold	--	
:CWRite	<Boolean>	--	Vector Signal Analysis
:ANALog	<Boolean>	--	
:HCONtinuous	<Boolean>	--	
[:STATe]	<Boolean>	--	
:SYMBol	DOTS | BARS | OFF		Vector Signal Analysis
:EYE			
COUNt	<numeric_value>	SYM	Vector Signal Analysis

DISPlay:FORMat

This command switches the test result display between FULL SCREEN and SPLIT SCREEN.

Syntax: DISPlay:FORmat SINGle | SPLit

Example: "DISP:FORM SPL"

Features: *RST value: SINGle
SCPI: device-specific

DISPlay:PROGram[:MODE]

This command switches the display between the measuring instrument and the computer function.

Syntax: DISPlay:PROGram[:MODE] ON | OFF

Example: "DISP:PROG ON"

Features: *RST value: OFF
SCPI: device-specific

This command is only valid in conjunction with Option Computer Function (FSE-B15).

DISPlay:ANNotation:FREQuency

This command switches the x-axis annotation on or off.

Syntax: DISPlay:ANNotation:FREQuency ON | OFF

Example: "DISP:ANN:FREQ OFF"

Features: *RST value: ON
SCPI: conforming

DISPlay:LOGO

This command switches the factory logo on the screen on or off.

Syntax: DISPlay:LOGO ON | OFF

Example: "DISP:LOGO OFF"

Features: *RST value: ON
SCPI: device-specific

DISPlay:CMAP<1 to 13>:DEFault

This command resets the screen colors of the instrument to their default settings.

Syntax: DISPlay:CMAP<1 to 13>:DEFault

Example: "DISP:CMAP:DEF"

Features: *RST value: --
SCPI: conforming

This command is an event and has thus no query and no *RST value assigned. The numeric suffix in CMAP<1 to 13> is not significant.

DISPlay:CMAP<1 to 13>:HSL

This command defines the color table of the instrument. To each numeric suffix of CMAP is assigned one or several picture elements which can be modified by varying the corresponding color setting. The following assignment applies:

CMAP1	Trace 1	CMAP8	Softkey State Data Entry
CMAP2	Trace 2	CMAP9	Softkey State OFF
CMAP3	Trace 3	CMAP10	Softkey Shade
CMAP4	Trace 4	CMAP11	Text
CMAP5	Marker	CMAP12	Title
CMAP6	Grid	CMAP13	Background
CMAP7	Softkey State On		

Syntax: DISPlay:CMAP<1 to 13>:HSL <hue>,<sat>,<lum>
hue = TINT
sat = SATURATION
lum = BRIGHTNESS

The value range is 0 to 1 for all parameters.

Example: "DISP:CMAP2:HSL 0.3,0.8,1.0"

Features: *RST value: --
SCPI: conforming

The values set are not changed by *RST.

DISPlay:CMAP<1 to 13>:PDEFined

This command defines the color table of the instrument using predefined color values. To each numeric suffix of CMAP is assigned one or several picture elements which can be modified by varying the corresponding color setting. The same assignment as for `DISPlay:CMAP<1 to 13>:HSL` applies.

Syntax: DISPlay:CMAP<1 to 13>:PDEFined BLACk | BLUE | BROWn | GREen | CYAN | RED | MAGenta | YELLow | WHITe | DGRAy | LGRAy | LBLUe | LGREen | LCYan | LRED | LMAGenta

Example: "DISP:CMAP2:PDEF GRE"

Features: *RST value: --
SCPI: conforming

The values set are not changed by *RST.

DISPlay[:WINDow<1|2>]:MINFo

This command switches the marker info list on the screen on or off.

Syntax: DISPlay[:WINDow<1|2>]:MINFo ON | OFF

Example: "DISP:MINF ON"

Features: *RST value: OFF
SCPI: device-specific

DISPlay[:WINDow<1|2>]:TEXT[:DATA]

This command defines a comment which can be displayed on the screen.

Syntax: DISPlay[:WINDow<1|2>]:TEXT[:DATA] <string>

Example: "DISP:TEXT "signal/noise power measurement"

Features: *RST value: "" (empty)
SCPI: conforming

The numeric suffix in WINDow<1|2> is not significant.

DISPlay[:WINDow<1|2>]:TEXT:STATe

This command switches on or off the screen display of the comment.

Syntax: DISPlay[:WINDow<1|2>]:TEXT:STATe ON | OFF

Example: "DISP:TEXT:STAT ON"

Features: *RST value: OFF
SCPI: conforming

The numeric suffix in WINDow<1|2> is not significant.

DISPlay[:WINDow<1|2>]:TIME

This command switches on or off the screen display of date and time.

Syntax: DISPlay[:WINDow<1|2>]:TIME ON | OFF

Example: "DISP:TIME ON"

Features: *RST value: OFF
SCPI: device-specific

The numeric suffix in WINDow<1|2> is not significant.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:RVALue

This command defines the reference value for the X-axis of the measuring diagram.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:RVALue <numeric_value>

Example: "DISP:TRAC:X:RVAL 20SYM"

Features: *RST value: -
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM

This command displays the zoomed current frequency range in the opposite window of the split screen representation.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM ON | OFF

Example: "DISP:TRAC:X:ZOOM ON"

Features: *RST value: OFF
SCPI: device-specific

The numeric suffix in TRACe<1 to 4> is not significant.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM[:FREQuency]:STARt

This command defines the start frequency of the zoomed display range. The value must lie between start and stop frequency of the original range.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM[:FREQuency]:STARt <numeric_value>

Example: `"DISP:TRAC:X:ZOOM:STAR 100MHZ"`

Features: *RST value: -- (depending on the current frequency setting)
SCPI: device-specific

The numeric suffix in TRACe<1 to 4> is not significant.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM[:FREQuency]:STOP

This command defines the stop frequency of the zoomed display range. The value must lie between start and stop frequency of the original range.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM[:FREQuency]:STOP <numeric_value>

Example: `"DISP:TRAC:X:ZOOM:STOP 200MHZ"`

Features: *RST value: -- (depending on the current frequency setting)
SCPI: device-specific

The numeric suffix in TRACe<1 to 4> is not significant.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM[:FREQuency]:CENTer

This command shifts the zoomed frequency range to the specified center frequency.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:X[:SCALe]:ZOOM[:FREQuency]:CENTer <numeric_value>

Example: `"DISP:TRAC:X:ZOOM:CENT 1GHZ"`

Features: *RST value: -- (depending on the current frequency setting)
SCPI: device-specific

The numeric suffix in TRACe<1 to 4> is not significant.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]

This command defines the display range of the Y-axis (level axis) with logarithmic scaling (DISP:TRAC:Y:SPAC LOG).

Syntax: DISPlay[:WINDow<1|2>:TRACe<1 to 4>:Y[:SCALe] <numeric_value>
<numeric_value>::= 10dB to 200dB

Example: `"DISP:TRAC:Y 110dB"`

Features: *RST value: 100dB
SCPI: device-specific

For linear scaling, (`DISP:TRAC:Y:SPAC LIN | PERC`) the display range is fixed and cannot be set.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:MODE

This command defines the scale of the y-axis (absolute or relative).

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:MODE ABSolute | RELative

Example: "DISP:TRAC:Y:MODE REL"

Features: *RST value: ABS
SCPI: device-specific

As long as SYSTem:DISPlay is set to OFF, this command does not directly influence the screen.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RLEVel

This command defines the reference level.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RLEVel <numeric_value>
<numeric_value>::= -200dBm to 200dBm

Example: "DISP:TRAC:Y:RLEV -60dBm"

Features: *RST value: -20dBm
SCPI: conforming

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RLEVel:OFFSet

This command defines the offset of the reference level.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RLEVel:OFFSet <numeric_value>
<numeric_value>::= -200dB to 200dB

Example: "DISP:TRAC:Y:RLEV:OFFS -10dB"

Features: *RST value: 0dB
SCPI: conforming

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RVALue

This command defines the reference value for the y-axis of the measurement diagram.
This defines the upper limit of the display range, the corresponding parameters of the manual control vary according to the measurement mode.

In the signal analysis mode the setting corresponds to the parameter MAX LEVEL

In the vector signal analysis mode the setting corresponds to the parameter REFERENCE VALUE Y AXIS.

IF option FSE-B8 to B11 (tracking generator) is fitted and the normalization in the analyzer mode is activated, the value corresponds to the parameter REFERENCE VALUE.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RVALue <numeric_value>

Example:
"DISP:TRAC:Y:RVAL -20dBm" (signal analysis)
"DISP:TRAC:Y:RVAL +1.20" (vector signal analysis)
"DISP:TRAC:Y:RVAL 0" (tracking generator)

Features: *RST value: - coupled to reference level
0 (vector signal analysis)
0 dB (tracking generator with active normalization)
SCPI: device specific

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RVALue:AUTO

This command defines whether the reference value for the y-axis of the measured diagram is coupled to the reference level (default) or can be set independently.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RVALue:AUTO ON | OFF

Example: "DISP:TRAC:Y:RVAL:AUTO ON"

Features: *RST value: ON
SCPI: device-specific

This command is available in the analyzer mode only.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RPOSition

This command defines the position of the reference value.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:RPOSition 0 to 100PCT

Example: "DISP:TRAC:Y:RPOS 50PCT"

Features: *RST value: 100PCT (FSE-B8 to B11)
50PCT (FSE-B7)
SCPI: conforming

This command is only valid in conjunction with option FSE-B7, Vector Signal Analysis, or option FSE-B8 to B11, Tracking Generator.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:PDIVision

This command defines the scaling of the Y-axis in the current unit.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y[:SCALe]:PDIVision <numeric_value>

Example: "DISP:TRAC:Y:PDIV +1.20" (FSE-B7)
"DISP:TRAC:Y:PDIV 0 dB" (FSE-B8)

Features: *RST value: -
SCPI: conforming

This command is only valid in conjunction with option FSE-B7, Vector Signal Analysis, and option FSE-B8 to B11, Tracking Generator.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y:SPACing

This command toggles between linear and logarithmic display.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:Y:SPACing
LINear | LOGarithmic | PERCent

Example: "DISP:TRAC:Y:SPAC LIN"

Features: *RST value: LOGarithmic
SCPI: conforming

The linear display can be LIN/% (PERCent) or LIN/dB (LINear).

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE

This command defines the type of display and the evaluation of the traces.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE
WRITe | VIEW | AVERage | MAXHold | MINHold

Example: "DISP:TRAC3:MODE MAXH"

Features: *RST value: WRITe for TRACe1, STATe OFF for TRACe2 to 4
SCPI: device-specific

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE:CWRite

This command selects continuous display of the measured values (continuous write).

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE:CWRite ON | OFF

Example: "DISP:TRAC3:MODE:CWR ON"

Features: *RST value: OFF
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE:ANALog

This command selects continuous display of the measured values in the analyzer mode (analog trace).

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE:ANALog ON | OFF

Example: "DISP:TRAC3:MODE:ANAL ON"

Features: *RST value: OFF
SCPI: device-specific

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE:HCONtinuous

This command defines whether the traces in the min hold/max hold mode are reset after some definite parameter changes.

OFF The traces are reset after some definite parameter changes.

ON This mechanism is switched off.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:MODE:HCONtinuous ON | OFF

Example: "DISP:TRAC3:MODE:HCON ON"

Features: *RST value: OFF
SCPI: device-specific

In general, parameter changes require a restart of the measurement before results are evaluated (e. g. with markers). For those changes that are known to require a new measurement (e. g. modification of the span), the trace is automatically reset so that erroneous evaluations of previous results are avoided. This mechanism can be switched off for those exceptional cases where the described behavior is unwelcome.

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:SYMBol

This command determines the display of the points of decision on the trace.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:SYMBol DOTS | BARS | OFF

Example: "DISP:TRAC:SYMB BARS"

Features: *RST value: OFF
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:EYE:COUNt

This command determines the display range of the eye diagram in symbols.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>:EYE:COUNt <numeric_value>
<numeric_value> ::= 1 **to** Result Length

Example: "DISP:TRAC:EYE:COUNt 5"

Features: *RST value: 2
SCPI: device-specific

This command is available only in the vector signal analysis mode (option FSE-B7).

DISPlay[:WINDow<1|2>]:TRACe<1 to 4>[:STATe]

This command switches the display of the corresponding trace on or off.

Syntax: DISPlay[:WINDow<1|2>]:TRACe<1 to 4>[:STATe] ON | OFF

Example: "DISP:TRAC3 ON"

Features: *RST value: ON for TRACe1, OFF for TRACe2 to 4
SCPI: conforming

This command is available only in the vector signal analysis mode (option FSE-B7).

3.6.9 FETCh Subsystem

The FETCh subsystem contains commands for reading out results of complex measurement tasks like those provided by options GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10. The FETCh-subsystem is closely linked to the functions of the CONFigure and READ-subsystems, where the measurement sequences are configured, the measurements are started and their results are queried.

3.6.9.1 FETCh:BURSt Subsystem

This subsystem provides the commands for reading out results of measurements in the GSM BTS (option FSE-K11) or GSM MS (option FSE-K10) Analyzer mode, which are performed on individual bursts (Carrier Power, Phase/Frequency Error) without starting the measurement by themselves.

COMMAND	PARAMETERS	UNIT	COMMENT
FETCh			Option FSE-K11 or FSE-K10
:BURSt			
:PERRor			
:RMS			
:AVERage?	--		
:MAXimum?	--		
:PEAK			
:AVERage?	--		
:MAXimum?	--		
:FERRor			
:AVERage?	--		
:MAXimum?	--		
:POWer	--		
[:IMMediate?]	--		
:ALL?	--		

FETCh:BURSt:PERRor:RMS:AVERage?

This command reads out the average of the RMS-measurement of the phase error taken over the selected number of bursts.

Syntax: FETCh:BURSt:PERRor:RMS:AVERage?

Example: `"FETC:BURS:PERR:RMS:AVER?"`

Features: *RST value: --
SCPI: device-specific

This command is a query and has therefore no *RST value assigned.
It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and when measurement of the phase/frequency error is selected (see `CONFigure:BURSt:PFERror`).

FETCh:BURSt:PERRor:RMS:MAXimum?

This command reads out the maximum of the RMS-measurement of the phase error for the selected number of bursts.

Syntax: FETCh:BURSt:PERRor:RMS:MAXimum?

Example: "FETC:BURS:PERR:RMS:MAX?"

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

FETCh:BURSt:PERRor:PEAK:AVERage?

This command reads out the average of the peak measurement of the phase error taken over the selected number of bursts.

Syntax: FETCh:BURSt:PERRor:PEAK:AVERage?

Example: "FETC:BURS:PERR:PEAK:AVER?"

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

FETCh:BURSt:PERRor:PEAK:MAXimum?

This command reads out the maximum of the peak measurement of the phase error for the selected number of bursts.

Syntax: FETCh:BURSt:PERRor:PEAK:MAXimum?

Example: "FETCh:BURS:PERR:PEAK:MAX?"

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

FETCh:BURSt:FERRor:AVERage?

This command reads out the average of the measurement of the frequency error taken over the selected number of bursts.

Syntax: FETCh:BURSt:FERRor:AVERage?

Example: "FETCh:BURS:FERR:AVER?"

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

FETCh:BURSt:FERRor:MAXimum?

This command reads out the maximum frequency error measured over the selected number of bursts.

Syntax: FETCh:BURSt:FERRor:MAXimum?

Example: "FETCh:BURS:FERR:MAX?"

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

FETCh:BURSt:POWer[:IMMediate?]

This command reads out the result of the last step performed during the measurement of the output power of the base station or mobile.

Syntax: FETCh:BURSt:POWer[:IMMediate]?

The result is output as an ASCII string in the following format:

<Static Power Ctrl>,<Dyn Power Ctrl>,<Rat-Level>,<Act-Level>,
<Delta>,<Status>

with

<Static Power Ctrl>:	current static power control level
<Dyn Power Ctrl>:	current dynamic power control level
<Rat-Level>:	Rated value for the current power control level acc. to standard dBm
<Act-Level>:	measured power in dBm
<Delta>:	Difference between the measured power and the power at the previous static/dynamic power control level.
<Status>:	Result of limit check in character data form: PASSED no limits exceeded FAILED limit exceeded

Example: "FETC:BURS:POW?"
Result: 0,0,43,44.1,0,PASSED

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

FETCh:BURSt:POWer:ALL?

This command reads out the results of all individual steps during the measurement of the output power of the base station or mobile.

Syntax: FETCh:BURSt:POWer:ALL?

The result is output as an ASCII string in the following format:

<Static Power Ctrl>,<Dyn Power Ctrl>,<Rat-Level>,<Act-Level>,
<Delta>,<Status>

with

<Static Power Ctrl>:	current static power control level
<Dyn Power Ctrl>:	current dynamic power control level
<Rat-Level>:	Rated value for the current power control level acc. to standard dBm
<Act-Level>:	measured power in dBm
<Delta>:	Difference between the measured power and the power at the previous static/dynamic power control level.
<Status>:	Result of limit check in character data form: PASSED no limits exceeded FAILED limit exceeded

Example: "FETC:BURS:POW:ALL?"
Result:
0,0,43,44.1,0,PASSED,1,0,41,42.5,1.6,PASSED,1,1,35,32.5,5.6,FAILED

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

3.6.9.2 FETCh:SPECtrum Subsystem

This subsystem provides the commands for reading out results of measurements in the GSM BTS (FSE-K11) or GSM MS (FSE-K10) Analyzer mode, used to measure the power of the spectral contributions due to modulation and switching (modulation spectrum, transient spectrum) without first restarting a new measurement.

COMMAND	PARAMETERS	UNIT	COMMENT
FETCh			Option FSE-K11 or FSE-K10
:SPECtrum			
:MODulation			
[:ALL?]	ARFCn | TXBand | RXBand | COMBined | DCSRx1800		
:SWITching			
[:ALL?]	--		

FETCh:SPECtrum:MODulation[:ALL]?

This command reads out the result of the measurement of the modulation spectrum of the base station or mobile.

Syntax: FETCh:SPECtrum:MODulation[:ALL]? ARFCn | TXBand | RXBand | COMBined | DCSRx1800

ARFCn::= ARFCN ± 1.8 MHz
TXBand::= TX-Band
RXBand::= RX-Band
COMBined::= ARFCN ± 1.8 MHz / TX-Band (option FSE-K11 only)
DCSRx1800::= RX band DCS 1800 (option FSE-K10 only)

The result is output as a list of partial result strings separated by ',' in the following (ASCII) format:

<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status> [,
<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status>]...

where the parts between '[...]' denote a partial result string that can be repeated n times.

<Index>: 0, if the partial result string characterizes a measurement range
current number <>0,
if the partial result string characterizes a single limit excess.

<Freq1>: Start frequency of the measurement range or frequency where the limit line is exceeded

<Freq2>: Start frequency of the measurement range or frequency exceeding the measurement range. The value of <Freq2> is equal to the value of <Freq1>, if either the measurement is performed in the time domain or if the partial result string contains a limit excess.

<Level>: Measured maximum level of the partial range or measured level at the test point.

<Limit>: Limit in the partial range or at the test point

<Abs/Rel>: ABS <Level> and <Limit> are in absolute units (dBm)
REL <Level> and <Limit> are in absolute units (dBm)

<Status>: Result of the limit check in character data form:
PASSED no limit exceeded
FAILED limit exceeded
MARGIN margin exceeded
EXC limit excess marked as an exception

The frequencies <Freq1> and <Freq2> are always absolute i. e. not referred to the carrier frequency.

Example: "FETC:SPEC:MOD? TXB"
Result: 0,890E6,915E6,-87.4,-108.0,ABS,FAILED,
1,893.2E6,893.2E6,-83.2,-108.0,ABS,FAILED,
2,895.7E6,895.7E6,-87.4,-108.0,ABS,FAILED

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the modulation spectrum is selected (see CONFigure:SPECtrum:MODulation).

FETCh:SPECtrum:SWITching[:ALL]?

This command reads out the result of the measurement of the transient spectrum of the base station or mobile.

Syntax: FETCh:SPECtrum:SWITching[:ALL]?

The result is output as a list of partial result strings separated by ',' as for the command FETCh:SPECtrum:MODulation[:ALL?].

Example: "FETC:SPEC:SWIT?"
Result: 0,833.4E6,833.4E6,37.4,-36.0,ABS,MARGIN,
1,834.0E6,834.0E6,-35.2,-36.0,ABS,FAILED,
2,834.6E6,834.6E6,-74.3,-75.0,REL,FAILED
0,835.0E6,835.0E6,-65,0,-60.0,REL,PASSED

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the transient spectrum is selected (see CONFigure:SPECtrum:MODulation).

3.6.9.3 FETCh:SPURious Subsystem

This subsystem provides the commands for reading out results of measurements in the GSM BTS (FSE-K11) or GSM MS (FSE-K10) Analyzer mode which are used to determine spurious emissions, without first restarting a new measurement.

COMMAND	PARAMETERS	UNIT	COMMENT
FETCh			Option FSE-K11 or FSE-K10
:SPURIOUS			
[:ALL?]	TXBand | OTXBand | RXBand | IDLeband		
:STEP?	--		

FETCh:SPURious[:ALL]?

This command reads out the results of the measurement of spurious emissions of the base station or mobile which is performed in the LIST mode.

Syntax: FETCh:SPURious[:ALL]? TXBand | OTXBand | RXBand | IDLeband

TXBand::= TX-band
OTXBand::= Not TX-band
RXBand::= RX-band (option FSE-K11 only)
IDLeband::= Idle band (option FSE-K10 only)

The result is output as a list of partial result strings separated by ',' in the following (ASCII) format:

<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status> [,
<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status>]...

where the parts between '[...]' denote a partial result string that can be repeated n times.

<Index>: 0, if the partial result string characterizes a measurement range
current number <>0,
if the partial result string characterizes a single limit excess.

<Freq1>: Start frequency of the measurement range or frequency where the limit line is exceeded

<Freq2>: Start frequency of the measurement range or frequency exceeding the measurement range. The value of <Freq2> is equal to the value of <Freq1>, if either the measurement is performed in the time domain or if the partial result string contains a limit excess.

<Level>: Measured maximum level of the partial range or measured level at the test point.

<Limit>: Limit in the partial range or at the test point

<Abs/Rel>: ABS <Level> and <Limit> are in absolute units (dBm)
REL <Level> and <Limit> are in absolute units (dBm)

<Status>: Result of the limit check in character data form:
PASSED no limit exceeded
FAILED limit exceeded
MARGIN margin exceeded

Example: "FETC:SPUR? TXB"
Result: 0,890E6,915E6,-87.4,-108.0,ABS,FAILED,
1,893.2E6,893.2E6,-83.2,-108.0,ABS,FAILED,
2,895.7E6,895.7E6,-87.4,-108.0,ABS,FAILED

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.

This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the spurious emissions is selected (see CONFigure:SPURious).

FETCh:SPURious:STEP?

This command reads out the result of the last single step of the measurement of spurious emissions performed in the STEP mode.

Syntax: FETCh:SPURious:STEP?

The result is output as a list of partial result strings separated by ',' as for the command FETCh:SPURious[:ALL?].

Example: "FETC:SPUR:STEP?"
Result: 0,890E6,915E6,-87.4,-108.0,ABS,FAILED,
1,893.2E6,893.2E6,-83.2,-108.0,ABS,FAILED,
2,895.7E6,895.7E6,-87.4,-108.0,ABS,FAILED

Features: *RST value: --
SCPI: device-specific

If no measurement has been performed yet, a query error results.

This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the spurious emissions is selected (see CONFigure:SPURious).

3.6.10 FORMat Subsystem

The FORMat subsystem specifies the data format of the data transmitted from and to the analyzer.

COMMAND	PARAMETERS	UNIT	COMMENT
FORMat [:DATA]	ASCii|REAL|UINT[,<numeric_value>]	-	

FORMat[:DATA]

This command specifies the data format of the data transmitted from and to the analyzer.

Syntax: FORMat[:DATA] ASCii | REAL| UINT[,<numeric_value>]
<numeric_value> ::= 32

Example:
```
"FORM REAL,32"
"FORM ASC"
```

Features: *RST value: ASCii
SCPI: conforming

The data format is either ASCii or one of the formats REAL or UINT (Unsigned Integer). ASCii data are transmitted in plain text, separated by commas. REAL data are transmitted as 32-bit IEEE 754 floating-point numbers in the "definite length block". The format UINT is only used in operating mode Vector Signal Analysis, for the symbol table.

The FORMat command is valid for the transmission of trace data. The data format of trace data received by the analyzer is automatically recognized, regardless of the format which is programmed.

3.6.11 HCOPy Subsystem

The HCOPy subsystem controls the output of display information for documentation purposes on output devices or files.

COMMAND	PARAMETERS	UNIT	COMMENT
HCOPy			
:ABORt	--		no query
:DESTination<1|2>	'SYST:COMM:GPIB'| 'SYST:COMM:SER1'| 'SYST:COMM:SER2'| 'SYST:COMM:CENT'| 'MMEM'		no query
:DEVice			
:COLor	<Boolean>		
:LANGuage<1|2>	HPGL | PCL4 | PCL5 | POSTscript | ESCP | WMF| PCX | HP7470 | EPSON24 | EPSON24C | PCL4_C | PCL4_C3 | LASERJ | DESKJ | DESKJ_C | DESKJ_C3 | HPGL_LS | HP7470LS		
:PRESet<1|2>	<Boolean>		
:RESolution<1|2>	<numeric_value>		
[:IMMediate<1|2>]	--		
:ITEM			no query
:ALL			
:FFEed<1|2>			no query
:STATe	<Boolean>		
:LABEL			
:TEXT	<string>		
:PFEed<1|2>			
:STATe	<Boolean>		
:WINDow<1|2>			
:TABle			
:STATe	<Boolean>		
:TEXT	<string>		
:TRACe			
:STATe	<Boolean>		
:CAINcrement	<Boolean>		
:PAGE			
:DIMensions			
:QUADrant<1 to 4>			no query
:FULL			no query
:ORIentation<1|2>	LANDscape|PORTrait		

HCOPy:ABORt

This command aborts a running hardcopy output.

Syntax: HCOPy:ABORt

Example: `"HCOP:ABOR"`

Features: *RST value: -
SCPI: conforming

This command is an event which is why it is not assigned an *RST value and no query.

HCOPy:DESTination<1|2>

This command selects the interface and the configuration (1 or 2) for the hardcopy device.

Syntax: HCOPy:DESTination<1|2> '<string>
<string>::= 'SYST:COMM:GPIB' |
'SYST:COMM:SER1' |
'SYST:COMM:SER2' |
'SYST:COMM:CENT' |
'MMEM'

Example: `"HCOP:DEST2 'SYST:COMM:SER2'"`

Features: *RST value: -
SCPI: conforming

This command is an event which is why it is not assigned an *RST value and no query. `HCOPy:DESTination 'MMEM'` creates a file for the hardcopy output. Command `MMEM:NAME <file_name>` defines the file name.

HCOPy:DEVice:LANGuage<1|2>

This command determines the data format of the printout.

Syntax: HCOPy:DEVice:LANGuage HPGL | PCL4 | PCL5 | POSTscript | ESCP | WMF| PCX | HP7470 | EPSON24| EPSON24C | PCL4_C | PCL4_C3 | LASERJ | DESKJ | DESKJ_C | DESKJ_C3 | HPGL_LS | HP7470LS

Example: `"HCOP:DEV:LANG WMF"`

Features: *RST value: -
SCPI: conforming

HPGL	data format for printout on a plotter in HPGL,
HP7470	special format for printout on a plotter hp7470 (reduced HPGL format)
HPGL_LS and HP7470LS	special HPGL/HP7470-format allowing output of the traces with variable Line_styles
PCL4.and PCL5	generic data formats for laser and ink-jet printers, with PCL4: Black/white PCL4_C: Color (3 color cartridges + black cartridge) PCL4_C3: Color (3 color cartridges only) PCL5: Black/white with 300DPI resolution, new language version.
LASERJ	Data format for HP-laserjet starting with series III
DESKJ...	Data formats for printers of HP-deskjet series, with DESKJ: Black/white DESKJ_C: Color (3 color cartridges + black cartridge, e. g. Deskjet 560) DESKJ_C3: Color (3 color cartridges only, e. g. Deskjet 500)
POSTscript	a printer language,
ESCP	data format for a 24-pin printer.
EPSON24	data format for Epson-compatible 24-needle printers, black/white, e. g. Epson LQ-series, R&S PDN
EPSON24C	data format for Epson-compatible 24-needle color printers, e. g. Epson Stylus Color, R&S PDN Color
WMF (WINDOWS Metafile Format) and PCX (pixel graphics)	data formats for output files which can at a later time be directly integrated in corresponding programs for documentation purposes.

HCOPy:DEVice:COLor

This command selects between color and monochrome hardcopy of the screen.

Syntax: HCOPy:DEVice:COLor ON|OFF

Example: "HCOP:DEV:COL ON"

Features: *RST value: OFF
SCPI: conforming

HCOPy:DEVice:PRESet<1|2>

This command resets the hardcopy unit (1 or 2) prior to generating the hardcopy.

Syntax: HCOPy:DEVice:PRESet<1|2> ON|OFF

Example: `"HCOP:DEV:PRES2 ON"`

Features: *RST value: OFF
SCPI: device-specific

HCOPy:DEVice:RESolution<1|2>

This command controls the resolution of the printout in PCL4 and HP-deskjet format (hardcopy unit 1 or 2).

Syntax: HCOPy:DEVice:RESolution<1|2> 150 | 300

Example: `"HCOP:DEV:RES 300"`

Features: *RST value: 150
SCPI: conforming

The resolution for an output in PCL4 format is between 150 dpi or 300 dpi.

HCOPy[:IMMediate<1|2>]

This command starts a hardcopy output.

Syntax: HCOPy[:IMMediate<1|2>]

Example: `"HCOP"`

Features: *RST value: -
SCPI: conforming

`HCOP[1]` starts the hardcopy output to device 1 (default), `HCOP2` starts the output to device 2. This command is an event which is why it is not assigned an *RST value and has no query.

HCOPy:DEVice:ITEM:ALL

This command selects the complete screen to be output.

Syntax: HCOPy:DEVice:ITEM:ALL

Example: `"HCOP:DEV:ITEM:ALL"`

Features: *RST value: OFF
SCPI: conforming

The hardcopy output is always provided with comments, title, time and date. As an alternative to the whole screen, only traces (commands `'HCOPy:DEVice:WINDow:TRACe: STATe ON'`) or tables (command `'HCOPy:DEVice:WINDow:TABLe:STATe ON'`) can be output.

HCOPy:DEVice:ITEM:FFEed<1|2>:STATe

The command adds a form feed command to the hardcopy output of the screen.

Syntax: HCOPy:DEVice:ITEM:FFEed<1|2>:STATe ON|OFF

Example: `"HCOP:DEV:ITEM:FFE2:STAT ON"`

Features: *RST value: OFF
SCPI: conforming

HCOPy:DEVice:ITEM:LABel:TEXT

This command defines the title of the screen.

Syntax: HCOPy:DEVice:ITEM:LABel:TEXT <string>

Example: `"HCOP:DEV:ITEM:LAB:TEXT 'My Title'"`

Features: *RST value: OFF
SCPI: conforming

HCOPy:DEVice:ITEM:PFEed<1|2>:STATe

This command adds a paper feed command to the hardcopy output of the screen (ON).

Syntax: HCOPy:DEVice:ITEM:PFEed<1|2>:STATe ON|OFF

Example: `"HCOP:DEV:ITEM:PFE2:STAT ON"`

Features: *RST value: OFF
SCPI: device-specific

HCOPy:DEVice:ITEM:WINDow<1|2>:TABle:STATe

This command selects the output of the currently displayed tables (ON).

Syntax: HCOPy:DEVice:ITEM:WINDow<1|2>:TABle:STATe ON | OFF

Example: `"HCOP:DEV:ITEM:WIND:TABL:STAT ON"`

Features: *RST value: OFF
SCPI: device-specific

The command `HCOPy:DEVice:ITEM:WINDow<1|2>:TABle:STATe OFF` same as command `HCOPy:DEVice:ITEM:ALL` enables the output of the whole screen.

HCOPy:DEVice:ITEM:WINDow<1|2>:TEXT

This command defines the comment text for printout to trace 1 or 2.

Syntax: HCOPy:DEVice:ITEM:WINDow<1|2>:TEXT <string>

Example: `"HCOP:DEV:ITEM:WIND2:TEXT 'comment'"`

Features: *RST value: -
SCPI: device-specific

HCOPy:DEVice:ITEM:WINDow<1|2>:TRACe:STATe

This command selects the output of the currently displayed trace (ON).

Syntax: HCOPy:DEVice:ITEM:WINDow<1|2>:TRACe:STATe ON | OFF

Example: `"HCOP:DEV:ITEM:WIND:TRACe:STAT ON"`

Features: *RST value: OFF
SCPI: device-specific

The command `HCOPy:DEVice:ITEM:WINDow<1|2>:TRACe:STATe OFF` same as command `HCOPy:DEVice:ITEM:ALL` enables the output of the whole screen.

HCOPy:DEVice:ITEM:WINDow<1|2>:TRACe:CAINcrement

The command automatically changes the colour of the currently displayed trace after printout (ON).

Syntax: HCOPy:DEVice:ITEM:WINDow<1|2>:TRACe:CAINcrement ON | OFF

Example: `"HCOP:DEV:ITEM:WIND:TRACe:CAIN ON"`

Features: *RST value: OFF
SCPI: device-specific

The automatic change of colour of the trace allows outputting to a plotter of several traces of the same diagram. For a better distinction, the colour of the trace is changed ("Color Auto Increment").

HCOPy:PAGE:DIMensions:QUADrant

The command defines the quadrant which is allocated to the screen output.

Syntax: HCOPy:PAGE:DIMensions:QUADrant<1 to 4>

Example: `"HCOP:PAGE:DIM:QUAD1"`

Features: *RST value: -
SCPI: conforming

The quadrants are defined as QUAD1 at the top right, QUAD2 at the top left, QUAD3 at the bottom left and QUAD4 at the bottom right. This command is an event which is why it is not assigned an *RST value and has no query.

HCOPy:PAGE:DIMensions:FULL

This command defines that the full screen is to be printed out.

Syntax: HCOPy:PAGE:DIMensions:FULL

Example: `"HCOP:PAGE:DIM:FULL"`

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned and *RST value and has no query.

HCOPy:PAGE:ORIentation<1|2>

The command selects the format of the output (portrait and landscape) (hardcopy unit 1 or 2).

Syntax: HCOPy:PAGE:ORIentation<1|2> LANDscape | PORTrait

Example: `"HCOP:PAGE:ORI LAND"`

Features: *RST value: -
SCPI: conforming

3.6.12 INITiate Subsystem

The INITiate subsystem checks the initialization of the trigger subsystem. In the split-screen representation, a distinction is made between INITiate1 (screen A) and INITiate2 (screen B)

COMMAND	PARAMETERS	UNIT	COMMENT
INITiate<1|2>			
:CONTinuous	<boolean>	--	
[:IMMediate]	--	--	no query
:DISPlay	<boolean>	--	

INITiate<1|2>:CONTinuous

This command determines if the trigger system is continuously initiated ("Free Run").

Syntax: INITiate<1|2>:CONTinuous ON | OFF

Example: `"INIT:CONT OFF"`

Features: *RST value: ON
SCPI: conforming

Setting `"INITiate:CONTinuous ON"` corresponds to function SWEEP CONTinuous, ie the sweep of the analyzer is cyclically repeated. The setting `"INITiate:CONTinuous OFF"` corresponds to function SWEEP SINGLE.

INITiate<1|2>[:IMMediate]

The command initiates a new sweep or starts a single sweep.

Syntax: INITiate<1|2>[:IMMediate]

Example: `"INIT"`

Features: *RST value: -
SCPI: conforming

This command is an event which is why it is not assigned an *RST value and has no query.

INITiate<1|2>:DISPlay

This command switches the display on or off during a single sweep.

Syntax: INITiate<1|2>:DISPlay ON | OFF

Example: `"INIT:DISP OFF"`

Features: *RST value: ON
SCPI: device-specific

3.6.13 INPut Subsystem

The INPut subsystem checks the input features of the instrument. In the split-screen representation, a distinction is made between INPut1 (screen A) and INPut2 (screen B).

COMMAND	PARAMETERS	UNIT	COMMENT
INPut<1|2>			
:ATTenuation	<numeric_value>	DB	
:AUTO	<Boolean>	--	
:MODE	NORMal | LNOise|LDIStortion	--	
:UPORt<1|2>			
[:VALue?]	--	--	query only
:STATe	<Boolean>	--	
:IMPedance	50 | 75	OHM	
:CORRection	RAM | RAZ		
:MIXer	<numeric_value>	DBM	

INPut<1|2>:ATTenuation

This command programs the input attenuator.

Syntax: INPut<1|2>:ATTenuation <numeric_value>
<numeric_value>::= 0 to 70 dB

Example: `"INP:ATT 40dB"`

Features: *RST value: - (AUTO is set to ON)
SCPI: conforming

The input attenuator can be programmed in steps of 10 dB. If the attenuation is directly programmed, the coupling to the reference level is switched off.

INPut<1|2>:ATTenuation:AUTO

This command automatically couples the input attenuation to the reference level.

Syntax: INPut<1|2>:ATTenuation:AUTO ON | OFF

Example: `"INP:ATT:AUTO ON"`

Features: *RST value: ON
SCPI: conforming

INPut<1|2>:ATTenuation:AUTO:MODE

This command optimizes the coupling of the input attenuation to the reference level to high sensitivity or to high intermodulation immunity.

Syntax: INPut<1|2>:ATTenuation:AUTO:MODE NORMal | LNOise | LDIStortion

Example: `"INP:ATT:AUTO:MODE LDIS"`

Features: *RST value: ON
SCPI: device-specific

For `LNOise`, the input attenuator value is set 10 dB lower than for `INPut:ATTenuation:AUTO:MODE NORMal`, for `LDIStortion` it is set 10 dB higher.

INPut<1|2>:UPORt<1|2>[:VALue]?

This command queries the control lines of the user ports.

Syntax: INPut<1|2>:UPORt<1|2>[:VALue]?

Example: `"INP:UPOR2?"`

Features: *RST value: -
SCPI: device-specific

This command is a query command which is why it is not assigned an *RST value.

INPut<1|2>:UPORt<1|2>:STATe

This command toggles the control lines of the user ports between INPut and OUTPut.

Syntax: INPut<1|2>:UPORt<1|2>:STATe ON | OFF

Example: `"INP:UPOR2:STAT ON"`

Features: *RST value: ON
SCPI: device-specific

With ON, the user port is switched to INPut, with OFF to OUTPut.

INPut<1|2>:IMPedance

This command sets the nominal input impedance of the analyzer.

Syntax: INPut<1|2>:IMPedance 50 | 75

Example: `"INP:IMP 75"`

Features: *RST value: 50
SCPI: conforming

Switching the input impedance to 75 Ω includes the matching elements RAM or RAZ selected by the command `INPut:IMPedance:CORRection`.

INPut<1|2>:IMPedance:CORRection

This command selects the matching element for 75 Ω input impedance.

Syntax: INPut<1|2>:IMPedance:CORRection RAM | RAZ

Example: `"INP:IMP:CORR RAM"`

Features: *RST value: - (INPut:IMPedance = 50 Ω)
SCPI: device-specific

INPut<1|2>:MIXer

This command defines the nominal mixer level of the analyzer.

Syntax: INPut<1|2>:MIXer <numeric value>
<numeric_value>::= -10 to -100 dBm

Example: `"INP:MIX -30"`

Features: *RST value: -
SCPI: device-specific

3.6.14 INSTrument Subsystem

The INSTrument subsystem selects the operating mode of the unit either via text parameters or fixed numbers.

COMMAND	PARAMETERS	UNIT	COMMENT
INSTrument<1|2>			
[:SELect]	SANalyzer | DDEMod | ADEMod | BSGM | MGSM		Vector Signal Analysis FSE-K11 or FSE-K10
:NSELect	<numeric_value>		
:COUPle	NONE | MODE | X | Y | CONTrol | XY | XCONtrol | YCONtrol | ALL		

INSTrument[:SELect]

This command switches between the operating modes by means of text parameters.

Syntax: INSTrument[:SELect] SANalyzer | DDEMod | ADEMod | BGSM
SANalyzer: spectrum analysis
DDEMod: vector signal analysis, digital demodulation
ADEMod: vector signal analysis, analog demodulation
BGSM: GSM BTS analysis
MGSM: GSM MS analysis

Example: `"INST DDEM"`

Features: *RST value: SANalyzer
SCPI: conforming

Switchover to DDEMod or ADEMod is only possible in conjunction with option FSE-B7, Vector Signal Analysis.
Switchover to BGSM is only possible in conjunction with option FSE-K11, GSM BTS Analyzer
Switchover to MGSM is only possible in conjunction with option FSE-K10, GSM MS Analyzer

INSTrument:NSELect

This command switches between the two modes by means of numbers.

Syntax: INSTrument:NSELect 1 | 2 | 3 | 4
1: spectrum analysis
2: vector signal analysis, digital demodulation
3: vector signal analysis, analog demodulation
4: GSM BTS analysis
5: GSM MS analysis

Example: `"INST:NSEL 2"`

Features: *RST value: 1
SCPI: conforming

Switchover to 2 or 3 is only possible in conjunction with option FSE-B7, Vector Signal Analysis.
Switchover to 4 is only possible in conjunction with option FSE-K11, GSM BTS Analyzer
Switchover to 5 is only possible in conjunction with option FSE-K10, GSM MS Analyzer

INSTrument:COUPle

This command defines the coupling between the two measurement windows screen A and B.

Syntax: INSTrument:COUPle NONE | MODE | X | Y | CONTrol | XY | XCONtrol | YCONtrol | ALL

Example: `"INST:COUP NONE"`

Features: *RST value: ALL
SCPI: device specific

NONE	no coupling.
MODE	the operating mode of the two screens is coupled.
X or Y	the scaling of the x- or y axis of the two screens is coupled.
CONTrol	the trigger and gate parameter ,and the sweep parameters SINGle/ CONTinous and COUNt of the two screens are coupled.
XY	the scaling of the x- and y-axis of the two screens are coupled.
XCONTrol bzw. YCONTrol	the trigger and gate parameter, and the sweep parameters SINGle CONTinous/ COUNt of the two screens are coupled.
ALL	the scaling of the x- or y axis the trigger and gate parameter and the sweep parameters SINGle/ CONTinous/ COUNt of the two screens are coupled.

3.6.15 MMEMory Subsystem

The MMEMory (mass memory) subsystem provides commands which allow for access to the storage media of the instrument and for storing and loading various instrument settings.
The NAME command stores the HCOPy outputs in a file.
The various drives can be addressed via the mass storage unit specifier <msus> using the conventional DOS syntax. The internal hard disk is addressed by "C:", the floppy-disk drive installed by "A:".
The file names <file_name> are indicated as string parameters with the commands being enclosed in quotation marks. They correspond to the DOS conventions.
DOS file names consist of max. 8 ASCII characters and an extension of up to three characters separated from the file name by a colon "." Both, the colon and the extension are optional. The colon is not part of the file name. DOS file names do not differ between uppercase and lowercase notation. All letters and digits are permitted as well as the special characters "_", "^", "$", "~", "!", "#", "%", "&", "-", "{", "}", "(", ")", "@" and "`". Reserved file names are CLOCK$, CON, AUX, COM1 to COM4, LPT1 to LPT3, NUL and PRN.
The two characters "*" and "?" have the function of so-called "wildcards", i.e., they are variables for selection of several files. The question mark "?" replaces exactly one character which may be any, the asterisk means any of the remaining characters in the file name. "*.*" thus means all files in a directory.

COMMAND	PARAMETERS	UNIT	COMMENT
MMEMory			
:CDIRectory	<directory_name>	--	
:COPY	<file_name>,<file_name>	--	no query
:DELete	<file_name>	--	no query
:INITialize	<msus>	--	no query
:LOAD			
:STATe	1,<file_name>	--	no query
:AUTO	1,<file_name>	--	no query
:MDIRectory	<directory_name>	--	no query
:MOVE	<file_name>,<file_name>	--	no query
:MSIS	<msus>	--	
:NAME	<file_name>	--	
:RDIRectory	<directory_name>	--	no query
:STORe			
:STATe	1,<file_name>	--	no query
:CLEar			
:STATe	1,<file_name>	--	no query
:ALL			no query
:SELect			
[:ITEM]			
:GSETup	<Boolean>		
:HWSettings	<Boolean>		
:TRACE<1 to 4>	<Boolean>		
:LINes			
[:ACTive]	<Boolean>		
:ALL	<Boolean>		
:CSETup	<Boolean>		
:HCOPy	<Boolean>		
:MACRos	<Boolean>		
:SCData	<Boolean>		Option FSE-B8 to B11
:TRANsducer			
[:ACTive]	<Boolean>		
:ALL	<Boolean>		
:ALL	--		no query
:NONE	--		no query
:DEFault	--		no query
:COMMent	<string>		

MMEMory:CDIRectory

This command changes the current directory.

Syntax: MMEMory:CDIRectory <directory_name>
<directory_name>::= DOS path name

Example: "MMEM:CDIR 'C:\USER\DATA'"

Features: *RST value: -
SCPI: conforming

In addition to the path name, the indication of the directory may contain the drive name. The path name complies with the DOS conventions.

MMEMory:COPY

This command copies the files indicated.

Syntax: MMEMory:COPY <file_source>,<file_destination>
<file_source>,<file_destination> ::= <file_name>
<file_name> ::= DOS file name

Example: "MMEM:COPY 'C:\USER\DATA\SETUP.CFG','A:'"

Features: *RST value: -
SCPI conforming

The indication of the file name may include the path and the drive. The file names and path information must be in accordance with the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:DELete

This command deletes the files indicated.

Syntax: MMEMory:DELete <file_name>
<file_name> ::= DOS file name

Example: "MMEM:DEL 'TEST01.HCP'"

Features: *RST value: -
SCPI: conforming

The indication of the file name contains the path and, optionally, the drive. Indication of the path corresponds to the DOS conventions. The file name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:INITialize

This command formats the disk in drive A.

Syntax: MMEMory:INITialize <msus>
<msus> ::= 'A:'

Example: "MMEM:INIT 'A:'"

Features: *RST value: -
SCPI: conforming

Formatting deletes all data stored on the floppy disk. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:LOAD:STATe

This command loads instrument settings from files.

Syntax: MMEMory:LOAD:STATe 1,<file_name>
<file_name> ::= DOS file name without extension

Example: "MMEM:LOAD:STAT 1,'A:TEST'"

Features: *RST value: -
SCPI: conforming

The contents of the file is loaded and set as new instrument state. The file name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:LOAD:AUTO

This command defines which device setting is automatically loaded after the instrument is switched on.

Syntax: MMEMory:LOAD:AUTO 1,<file_name>
<file_name> ::= DOS file name without extension;
FACTORY denotes the data set previously in the instrument

Example: "MMEM:LOAD:AUTO 1,'C:\USER\DATA\TEST'"

Features: *RST value: -
SCPI: device-specific

The contents of the file are read after switching on the instrument and used to define the new device state. The file name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:MDIRectory

This command creates a new directory.

Syntax: MMEMory:MDIRectory <directory_name>
<directory_name>::= DOS path name

Example: "MMEM:MDIR 'C:\USER\DATA'"

Features: *RST value: -
SCPI: device-specific

The file name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:MOVE

This command renames existing files.

Syntax: MMEMory:MOVE <file_source>,<file_destination>
<file_source>,<file_destination> ::= <file_name>
<file_name> ::= DOS file name

Example: "MMEM:MOVE 'TEST01.CFG','SETUP.CFG'"

Features: *RST value: -
SCPI: conforming

The file name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:MSIS

This command changes to the drive indicated.

Syntax: MMEMory:MSIS <device>
<device>::= 'A:' | 'C:'

Example: "MMEM:MSIS 'A:'"

Features: *RST value: "C:'
SCPI: conforming

The drive may be the internal hard disk C: or the floppy-disk drive A:. The drive is indicated according to the DOS conventions.

MMEMory:NAME

This command specifies a file which is printed or plotted to.

Syntax: MMEMory:NAME <file_name>
<file_name> ::= DOS filename

Example: "MMEM:NAME 'PLOT1.HPG'"

Features: *RST value: -
SCPI: conforming

The file name includes indication of the path and may also include the drive. The file name and path information correspond to the DOS conventions. The output to the printer is routed into a file using the command "HCOP:DEST 'MMEM'".

MMEMory:RDIRectory

This command deletes the directory indicated.

Syntax: MMEMory:RDIRectory <directory_name>
<directory_name>::= DOS path name

Example: "MMEM:RDIR 'C:\TEST'"

Features: *RST value: -
SCPI: device-specific

The directory name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:STORe:STATe

This command stores the current instrument setting in a file.

Syntax: MMEMory:STORe:STATe 1,<file_name>
<file_name> ::= DOS file name without extension

Example: "MMEM:STOR:STAT 1,'TEST'"

Features: *RST value: -
SCPI: conforming

The current instrument state is stored as a file. The file name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:CLEar:STATe

This command deletes the instrument setting denoted by <file_name>.

Syntax: MMEMory:CLEar:STATe 1,<file_name>
<file_name> ::= DOS file name without extension

Example: "MMEM:CLE:STAT 1,'TEST'"

Features: *RST value: -
SCPI: device-specific

The device data set specified is deleted. The file name includes indication of the path and may also include the drive. The path name corresponds to the DOS conventions. This command is an event which is why it is not assigned an *RST value and has no query.

MMEMory:CLEar:ALL

This command deletes all instrument settings in the current directory.

Syntax: MMEMory:CLEar:ALL

Example: "MMEM:CLE:ALL"

Features: *RST value: -
SCPI: device-specific

This command is an "event" which is why it is not assigned an *RST value and has no query.

MMEMory:SELect[:ITEM]:GSETup

This command includes the data of the general setup in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:GSETup ON | OFF

Example: "MMEM:SEL:GSET ON"

Features: *RST value: OFF
SCPI: device-specific

MMEMory:SELect[:ITEM]:HWSettings

This command includes the hardware settings in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:HWSettings ON | OFF

Example: "MMEM:SEL:HWS ON"

Features: *RST value: ON
SCPI: device-specific

Level and frequency lines are stored with this command as well.

MMEMory:SELect[:ITEM]:TRACe<1 to 4>

This command includes the data of the selected trace in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:TRACe<1 to 4> ON | OFF

Example: "MMEM:SEL:TRACE3 ON"

Features: *RST value: OFF for all Traces
SCPI: device-specific

MMEMory:SELect[:ITEM]:LINes[:ACTive]

This command includes the active limit lines in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:LINes[:ACTive] ON | OFF

Example: "MMEM:SEL:LIN ON"

Features: *RST value: ON
SCPI: device-specific

Upon MMEM:LOAD the limit lines which are not currently active but contained in the data set are restored as well.

MMEMory:SELect[:ITEM]:LINes:ALL

This command includes all limit lines in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:LINes:ALL ON | OFF

Example: "MMEM:SEL:LIN:ALL ON"

Features: *RST value: ON
SCPI: device-specific

This command includes selection of the active limit lines.

MMEMory:SELect[:ITEM]:CSETup

This command includes the current color setting in the list of partial datasets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:CSETup ON | OFF

Example: "MMEM:SEL:CSET ON"

Features: *RST value: ON
SCPI: device-specific

MMEMory:SELect[:ITEM]:HCOPy

This command includes the hardcopy settings in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:HCOPy ON | OFF

Example: "MMEM:SEL:HCOPy ON"

Features: *RST value: ON
SCPI: device-specific

MMEMory:SELect[:ITEM]:MACRos

This command includes the keyboard macros in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:MACRos ON | OFF

Example: "MMEM:SEL:MACRos ON"

Features: *RST value: OFF
SCPI: device-specific

MMEMory:SELect[:ITEM]:SCData

This command includes the generator calibration data in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:SCData ON | OFF

Example: "MMEM:SEL:SCData ON"

Features: *RST value: OFF
SCPI: device-specific

This command only available in conjunction with the option Tracking Generator FSE-B8 to -B11

MMEMory:SELect[:ITEM]:TRANsducer[:ACTive]

This command includes the active transducer factors and set in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:TRANsducer[:ACTive] ON | OFF

Example: "MMEM:SEL:TRAN ON"

Features: *RST value: ON
SCPI: device-specific

Upon MMEM:LOAD the transducer factors and sets which are not currently active but contained in the data set are restored as well.

MMEMory:SELect[:ITEM]:TRANsducer:ALL

This command includes all transducer factors and sets in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:TRANsducer:ALL ON | OFF

Example: "MMEM:SEL:TRAN:ALL ON"

Features: *RST value: ON
SCPI: device-specific

This command is an event and therefore has no *RST value assigned.

MMEMory:SELect[:ITEM]:ALL

This command includes all data subsets in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:ALL

Example: "MMEM:SEL:ALL"

Features: *RST value: --
SCPI: device-specific

This command is an event and therefore has no *RST value assigned.

MMEMory:SELect[:ITEM]:NONE

This command deletes all data subsets in the list of data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:NONE

Example: "MMEM:SEL:NONE"

Features: *RST value: --
SCPI: device-specific

This command is an event and therefore has no *RST value assigned.

MMEMory:SELect[:ITEM]:DEFault

This command sets the default list of the data subsets of a device setting to be stored/loaded.

Syntax: MMEMory:SELect[:ITEM]:DEFault

Example: "MMEM:SEL:DEFault"

Features: *RST value: --
SCPI: device-specific

This command is an event and therefore has no *RST value assigned.

MMEMory:COMMent

This command defines a comment for a device setting to be stored.

Syntax: MMEMory:COMMent <string>

Example: "MMEM:COMM 'Setup for GSM measurement'"

Features: *RST value: blank comment
SCPI: device-specific

3.6.16 OUTPut Subsystem

The OUTPut subsystem checks the output features of the instrument.
In conjunction with option FSE-B8/B11, tracking generator, in the split screen mode, a distinction is made between OUTPut1 (screen A) and OUTPut2 (screen B).

COMMAND	PARAMETERS	UNIT	COMMENT
OUTPut<1|2>			
[:STATe]	<boolean>	--	Option FSE-B8 to B11
:UPORt<1|2>			
[:VALue]	<binary>	--	
:STATe	<boolean>	--	
:AF			
:SENSitivity	<numeric_value	PCT | HZ | KHZ | DEG | RAD	Vector Signal Analysis

OUTPut<1|2>[:STATe]

This command switches the tracking generator on or off.

Syntax: OUTPut:[:STATe] ON | OFF

Example: `"OUTP ON"`

Features: *RST value: -
SCPI: conforming

This command is only valid in conjunction with one of the options FSE-B8 to FSE-B11.

OUTPut:UPORt<1|2>[:VALue

This command sets the control lines of the user ports.

Syntax: OUTPut:UPORt<1|2>[:VALue] <binary>
<Binary>::= #B00000000 to #B11111111

Example: `"OUTP:UPOR2 #B10100101"`

Features: *RST value: -
SCPI: device-specific

User port 1 or 2 is written with the given binary pattern. If the user port is programmed to INPut instead of OUTPut, the output value is temporarily stored.

OUTPut:UPORt<1|2>:STATe

This command toggles the control lines of the user ports between INPut and OUTPut.

Syntax: OUTPut:UPORt<1|2>:STATe ON | OFF

Example: `"OUTP:UPOR:STAT ON"`

Features: *RST value: OFF
SCPI: device-specific

With ON, the user port is switched to OUTPut, with OFF to INPut.

OUTPut:AF:SENSitivity

This command changes the sensitivity of the AF-output.

Syntax: OUTPut:AF:SENSitivity <numeric_value>
<numeric_value> ::= 0.1 PCT to 100 PCT for AM
0.1 KHZ to 100 KHZ for FM
0.0 1RAD to 10 RAD for PM

Example: `"OUTP:AF:SENS 20PCT"`

Features: *RST value: 100 % for AM
100 kHz for FM
10 rad for PM
SCPI: device-specific

The command is only valid in the analog demodulation mode (Vector Signal Analysis, FSE-B7).

3.6.17 READ Subsystem

The READ-subsystem contains commands for starting complex measurement tasks such as those provided by options GSM BTS Analyzer (FSE-K11) or GSM MS Analyzer (FSE-K10), and for querying the results subsequently. The READ-subsystem is closely linked to the functions of the CONFigure- and FETCh-subsystems, where the measurement sequences are configured or the results are queried without restarting a new measurement.

3.6.17.1 READ:BURSt Subsystem

This subsystem provides the commands for starting measurements in the GSM BTS Analyzer mode (option FSE-K11), which are performed on individual bursts (carrier power, phase/frequency error), and for reading out the results subsequently.

COMMAND	PARAMETERS	UNIT	COMMENT
READ			
:BURSt			Option FSE-K11 or FSE-K10
:PERRor			
:RMS			
:AVERage?	--		query only
:MAXimum?	--		query only
:PEAK			
:AVERage?	--		query only
:MAXimum?	--		query only
:FERRor			
:AVERage?	--		query only
:MAXimum?	--		query only
:POWer?	--		
:STATic?	--		query only; FSE-K11 only
:DYNamic?	--		query only; FSE-K11 only
:LEVel?	--		query only; FSE-K10 only

READ:BURSt:PERRor:RMS:AVERage?

This command starts the measurement of the phase and frequency error of the base station or mobile and reads out the average of the RMS-measurement of the phase error taken over the selected number of bursts.

Syntax: READ:BURSt:PERRor:RMS:AVERage?

Example: "READ:BURS:PERR:RMS:AVER?"

Features: *RST value: --
SCPI: device-specific

When the measurement is started the instrument automatically assumes the SINGLE mode.

An ongoing measurement can be aborted via the command ABORt. Further results of the phase/frequency error measurement can be then queried without restart of the measurement via the FETCh:BURSt-subsystem.

This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

READ:BURSt:PERRor:RMS:MAXimum?

This command starts the measurement of the phase and frequency error of the base station or mobile and reads out the maximum of the RMS-measurement of the phase error for the selected number of bursts.

Syntax: READ:BURSt:PERRor:RMS:MAXimum?

Example: "READ:BURS:PERR:RMS:MAX?"

Features: *RST value: --
SCPI: device-specific

When the measurement is started the instrument automatically assumes the SINGLE mode.
An ongoing measurement can be aborted via the command ABORt. Further results of the phase/frequency error measurement can be then queried without restart of the measurement via the FETCh:BURSt-subsystem.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

READ:BURSt:PERRor:PEAK:AVERage?

This command starts the measurement of the phase and frequency error of the base station or mobile and reads out the maximum of the peak measurement of the phase error taken over the selected number of bursts.

Syntax: READ:BURSt:PERRor:PEAK:AVERage?

Example: "READ:BURS:PERR:PEAK:AVER?"

Features: *RST value: --
SCPI: device-specific

When the measurement is started the instrument automatically assumes the SINGLE mode.
An ongoing measurement can be aborted via the command ABORt. Further results of the phase/frequency error measurement can be then queried without restart of the measurement via the FETCh:BURSt-subsystem.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

READ:BURSt:PERRor:PEAK:MAXimum?

This command starts the measurement of the phase and frequency error of the base station or mobile and reads out the maximum of the peak measurement of the phase error for the selected number of bursts.

Syntax: READ:BURSt:PERRor:PEAK:MAXimum?

Example: "READ:BURS:PERR:PEAK:MAX?"

Features: *RST value: --
SCPI: device-specific

When the measurement is started the instrument automatically assumes the SINGLE mode.
An ongoing measurement can be aborted via the command ABORt. Further results of the phase/frequency error measurement can be then queried without restart of the measurement via the FETCh:BURSt-subsystem.
This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

READ:BURSt:FERRor:AVERage?

This command starts the measurement of the phase and frequency error of the base station or mobile and reads out the average of the frequency error taken over the selected number of bursts.

Syntax: READ:BURSt:FERRor:AVERage?

Example: "READ:BURS:FERR:AVER?"

Features: *RST value: --
SCPI: device-specific

When the measurement is started the instrument automatically assumes the SINGLE mode.

An ongoing measurement can be aborted via the command ABORt. Further results of the phase/frequency error measurement can be then queried without restart of the measurement via the FETCh:BURSt-subsystem.

This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

READ:BURSt:FERRor:MAXimum?

This command starts the measurement of the phase and frequency error of the base station or mobile and reads out the maximum of the frequency error for the selected number of bursts.

Syntax: READ:BURSt:FERRor:MAXimum?

Example: "READ:BURS:FERR:MAX?"

Features: *RST value: --
SCPI: device-specific

When the measurement is started the instrument automatically assumes the SINGLE mode.

An ongoing measurement can be aborted via the command ABORt. Further results of the phase/frequency error measurement can be then queried without restart of the measurement via the FETCh:BURSt-subsystem.

This command is a query only and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the phase/frequency error is selected (see CONFigure:BURSt:PFERror).

READ:BURSt:POWer?

This command starts the measurement of the maximum output power of the base station or mobile and reads out the result.

Measurement of the maximum output power marks the beginning of a measurement cycle where subsequently the limits of the static and dynamic power control levels are checked step by step (`READ:BURSt:STATic?` or `READ:BURSt:DYNamic?`).

Syntax: READ:BURSt:POWer?

The result is read out as an ASCII string in the following format:

<Static Power Ctrl>,<Dyn Power Ctrl>,<Rat-Level>,<Act-Level>,
<Delta>,<Status>

<Static Power Ctrl>:	0
<Dyn Power Ctrl>:	0
<Rat-Level>:	rated value for the current power control level acc. to standard in dBm
<Act-Level>:	measured power in dBm
<Delta>:	0
<Status>:	result of limit check in character data form: PASSED no limits exceeded FAILED limit exceeded

Example: "`READ:BURS:POW?`"
Result: `0,0,43,44.1,0,PASSED`

Features: *RST value: --
SCPI: device-specific

When the measurement is started any ongoing measurement cycle is aborted.
An ongoing measurement can be aborted with the command `ABORT`. This command is a query only and has therefore no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and when measurement of the maximum carrier power is selected (see `CONFigure:BURSt:POWer`).

READ:BURSt:POWer:STATic?

This command increases the static power control level for the measurement by one step, measures the output power of the base station and reads out the result.

If the command `READ:BURSt:POWer:STATic?` is repeated after the maximum static power control level is reached, the measurement sequence is terminated and the result of the maximum static power control level is read out again. In this case the value 'FINISHED' indicating the status is read out. Before the status value 'FINISHED' is read out, the value 'RUNNING' is output if the total result of the limit check is queried via `CALCulate<1|2>:LIMit<1 to 8>:BURSt:POWer?`.

Syntax: READ:BURSt:POWer:STATic?

The result is read out as an ASCII string in the following format:

<Static Power Ctrl>,<Dyn Power Ctrl>,<Rat-Level>,<Act-Level>,
<Delta>,<Status>

<Static Power Ctrl>:	current static power control level
<Dyn Power Ctrl>:	current dynamic power control level
<Rat-Level>:	rated value for the current power control level acc. to standard in dBm
<Act-Level>:	measured power in dBm
<Delta>:	difference between the measured power and the power at the previous static power control level.
<Status>:	result of the limit check in character data form:
	PASSED no limit exceeded
	FAILED limit exceeded
	FINISHED measurement sequence terminated

Example: "`READ:BURS:POW:STAT?`"
Result: `1,0,41,42.5,1.6,PASSED`

Features: *RST value: --
SCPI: device-specific

The command `ABORt` terminates an ongoing measurement and resets the static and dynamic power control level to 0.
This command is only a query and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, and if measurement of the maximum carrier power is selected. (see `CONFigure:BURSt:POWer`).

READ:BURSt:POWer:DYNamic?

This command increases the dynamic power control level for the measurement by one step, measures the output power of the base station and reads out the result.

Once the maximum dynamic power control level is reached the command is accepted only after the static power control level is increased by one step.

Note that the command is no longer accepted after the measurement sequence is terminated which implies that the static power control level was read out again with `READ:BURSt:POWer:STATic?` after the maximum value was reached and marked with the 'FINISHED' status.

Syntax: READ:BURSt:POWer:DYNamic?

The result is read out as an ASCII string in the following format:

<Static Power Ctrl>,<Dyn Power Ctrl>,<Rat-Level>,<Act-Level>,
<Delta>,<Status>

<Static Power Ctrl>:	current static power control level
<Dyn Power Ctrl>:	current dynamic power control level
<Rat-Level>:	rated value for the current power control level acc. to standard in dBm
<Act-Level>:	measured power in dBm
<Delta>:	difference between the measured power and the power at the previous dynamic power control level.
<Status>:	result of the limit check in character data form: PASSED no limit exceeded FAILED limit exceeded

Example: `"READ:BURS:POW:DYN?"`
Result: `1,3,35,32.5,5.6,FAILED`

Features: *RST value: --
SCPI: device-specific

The command `ABORt` terminates an ongoing measurement and resets the static and dynamic power control level to 0.
This command is only a query and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, and if measurement of the maximum carrier power is selected. (see `CONFigure:BURSt:POWer`).

READ:BURSt:POWer:LEVel?

This command increases the power control level for the measurement by one step, measures the output power of the mobile and reads out the result.

Note that the command is no longer accepted after the measurement sequence is terminated which implies that the power control level was read out again with `READ:BURSt:POWer:LEVel?` after the maximum value was reached and marked with the 'FINISHED' status.

Syntax: READ:BURSt:POWer:LEVel?

The result is read out as an ASCII string in the following format:

<0>, <Power Ctrl Level>,<Rat-Level>,<Act-Level>, <Delta>,<Status>

<0>:	always 0 (this field is only significant for option FSE-K11)
<Power Ctrl Level>:	current power control level
<Rat-Level>:	rated value for the current power control level acc. to standard in dBm
<Act-Level>:	measured power in dBm
<Delta>:	difference between the measured power and the power at the previous power control level.
<Status>:	result of the limit check in character data form: PASSED no limit exceeded FAILED limit exceeded

Example: "`READ:BURS:POW:LEV?`"
Result: `0,3,35,32.5,5.6,FAILED`

Features: *RST value: --
SCPI: device-specific

The command `ABORt` terminates an ongoing measurement and resets the power control level to 0. This command is only a query and therefore has no *RST value assigned. It is available only in conjunction with option GSM MS Analyzer, FSE-K10, and if measurement of the maximum carrier power is selected. (see `CONFigure:BURSt:POWer`).

3.6.17.2 READ:SPECtrum Subsystem

This subsystem provides the commands for starting measurements in the GSM BTS (option FSE-K11) and GSM MS (option FSE-K10) Analyzer mode, which are used to measure the power of the spectral components due to modulation and switching (modulation spectrum, transient spectrum), and for reading out the results subsequently.

COMMAND	PARAMETERS	UNIT	COMMENT
READ			
:SPECtrum			Option FSE-K11 or FSE-K10
:MODulation			
[:ALL?]	--		
:SWITching			
[:ALL?]	--		

READ:SPECtrum:MODulation[:ALL]?

This command starts the measurement of the modulation spectrum of the base station or mobile and reads out the result. The measurement is performed in the currently set frequency range.

Syntax: READ:SPECtrum:MODulation[:ALL]?

The result is read out as a list of partial ASCII result strings separated by ',' in the following format:

<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status> [,
<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status>]...

where the part set in '[...]' characterizes a partial result string which can be repeated n times.

<Index>: 0, if the partial result string characterizes a measurement range.
current number <>0, if the partial result string characterizes a single limit excess.

<Freq1>: Start frequency of the measurement range or frequency where the limit is exceeded.

<Freq2>: Stop frequency of the measurement range or frequency where the measured range is exceeded. The value of <Freq2> is equal to the value of <Freq1>, if either the measurement is performed in the time domain or the partial result string contains a limit excess.

<Level>: Measured maximum level of the partial range or measured level at the test point.

<Limit>: Limit in the partial range or at the test point.

<Abs/Rel>: ABS <Level> and <Limit> are in absolute units (dBm)
REL <Level> and <Limit> are in relative units (dBm)

<Status>: Result of the limit check in character data form:
PASSED no limit exceeded
FAILED limit exceeded
MARGIN margin exceeded
EXC limited excess characterized as an exception

The frequencies <Freq1> and <Freq2> are always absolute and not referred to the carrier frequency.

Example: "READ:SPEC:MOD?"
Result: 0,890E6,915E6,-87.4,-108.0,ABS,FAILED,
1,893.2E6,893.2E6,-83.2,-108.0,ABS,FAILED,
2,895.7E6,895.7E6,-87.4,-108.0,ABS,FAILED

Features: *RST value: --
SCPI: device-specific

The command ABORt aborts an ongoing measurement.
This command is only a query and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the modulation spectrum is selected. (see CONFigure:SPECtrum:MODulation).

READ:SPECtrum:SWITching[:ALL]?

This command starts the measurement of the transient spectrum of the base station or mobile and reads out the result.

Syntax: READ:SPECtrum:SWITching[:ALL]?

The result is read out as a list of partial ASCII result strings separated by ',' in the format used for READ:SPECtrum:MODulation[:ALL?].

Example: "READ:SPEC:SWIT?"
Result: 0,833.4E6,833.4E6,37.4,-36.0,ABS,MARGIN,
1,834.0E6,834.0E6,-35.2,-36.0,ABS,FAILED,
2,834.6E6,834.6E6,-74.3,-75.0,REL,FAILED
0,835.0E6,835.0E6,-65,0,-60.0,REL,PASSED

Features: *RST value: --
SCPI: device-specific

The command ABORt aborts an ongoing measurement.
This command is only a query and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the transient spectrum is selected. (see CONFigure:SPECtrum:SWITCHing).

3.6.17.3 READ:SPURious Subsystem

This subsystem provides the commands for starting measurements in the GSM BTS (option FSE-K11) and GSM MS (option FSE-K10) Analyzer mode, which are used to measure the power of spurious emissions, and for reading out the results subsequently.

COMMAND	PARAMETERS	UNIT	COMMENT
READ :SPURIOUS [:ALL?] :STEP?			Option FSE-K11 or FSE-K10

READ:SPURious[:ALL]?

This command starts the measurement of the spurious emissions of the base station or mobile and reads out the result. The measurement is performed in the currently set frequency range.

Syntax: READ:SPUR[:ALL]?

The result is read out as a list of partial ASCII result strings separated by ',' in the following format:

<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status> [,
<Index>,<Freq1>,<Freq2>,<Level>,<Limit>, <Abs/Rel>,<Status>]...

where the part set in '[...]' characterizes a partial result string which can be repeated n times.

<Index>: 0, if the partial result string characterizes a measurement range.
current number <>0, if the partial result string characterizes a single limit excess.

<Freq1>: Start frequency of the measurement range or frequency where the limit is exceeded.

<Freq2>: Stop frequency of the measurement range or frequency where the measured range is exceeded. The value of <Freq2> is equal to the value of <Freq1>, if either the measurement is performed in the time domain or the partial result string contains a limit excess.

<Level>: Measured maximum level of the partial range or measured level at the test point.

<Limit>: Limit in the partial range or at the test point.

<Abs/Rel>: ABS <Level> and <Limit> are in absolute units (dBm)
REL <Level> and <Limit> are in absolute units (dBm)

<Status>: Result of the limit check in character data form:
PASSED no limit exceeded
FAILED limit exceeded
MARGIN margin exceeded

Example: "READ:SPUR?"
Result:
```
0,890E6,915E6,-87.4,-108.0,ABS,FAILED,
1,893.2E6,893.2E6,-83.2,-108.0,ABS,FAILED,
2,895.7E6,895.7E6,-87.4,-108.0,ABS,FAILED
```

Features: *RST value: --
SCPI: device-specific

The command ABORt aborts an ongoing measurement.
This command is only a query and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the spurious emissions is selected. (see CONFigure:SPURious).

READ:SPURious:STEP?

This command starts the next single step for measuring the spurious emissions in the STEP mode and reads out the results. The measurement is performed in the currently set frequency range.

If the command READ:SPURious:STEP? is sent again after the last single step is reached, the measurement sequence is terminated, the result of the last single step is output again and characterized by the value 'FINISHED' indicating its status. Until the status value 'FINISHED' is returned, the value 'RUNNING' is output when the total result of the limit check is queried with the command CALCulate<1|2>:LIMit<1 to 8>:SPURious?.

Afterwards, sending the command again causes a restart of the measurement.

Syntax: READ:SPUR:STEP?

The measured result is read out as a list of partial result strings separated by ',' and in the same format as for the command READ:SPURious[:ALL?].
The additional status value 'FINISHED' marks the end of a measurement sequence.

Example: "READ:SPUR:STEP?"

Result:	First query:	0,890E6,915E6,-87.4,-108.0,ABS,FAILED
	...	
	Second-last query:	1,893.2E6,893.2E6,-83.2,-108.0,ABS,FAILED
	Last query:	1,893.2E6,893.2E6,-83.2,-108.0,ABS,FINISHED

Features: *RST value: --
SCPI: device-specific

The command ABORt aborts an ongoing measurement. If the command READ:SPURious:STEP? is sent again, the instrument restarts with the first single step.

This command is only a query and therefore has no *RST value assigned. It is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and if measurement of the spurious emissions is selected. (see CONFigure:SPURious).

3.6.18 SENSe Subsystem

The SENSe subsystem is itself divided up into several subsystems. The commands of these subsystems directly control device-specific settings, they do not refer to the signal characteristics of the measurement signal.
The SENSe subsystem controls the essential parameters of the analyzer and vector analyzer. In accordance with the SCPI standard, it is for this reason optional, which means that it is not necessary to include the SENSe node in command sequences.

3.6.18.1 SENSe:ADEMod Subsystem

This subsystem controls the parameters for analog demodulation. It is active only in conjunction with option Vector Signal Analysis, FSE-B7.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe<1|2>]			
:ADEMod			option Vector Signal Analysis
:AF			
:COUPling	AC | DC		
:SQUelch			
[:STATe]	<Boolean>		
:LEVel	<numeric_value>	DBM	
:SBANd	NORMal | INVerse		
:RTIMe	<Boolean>		

[SENSe:]ADEMod:AF:COUPling

This command selects coupling of the AF-branch.

Syntax: [SENSe:]ADEMod:AF:COUPling AC | DC

Example: `"ADEM:AF:COUP DC"`

Features: *RST value: AC
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]ADEMod:SQUelch[:STATe]

This command switches the squelch for the audio branch on or off.

Syntax: [SENSe:]ADEMod:SQUelch ON | OFF

Example: `"ADEM:SQU ON"`

Features: *RST value: OFF
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]ADEMod:SQUelch:LEVel

This command defines the switching threshold for the squelch referred to the measured signal.

Syntax: [SENSe:]ADEMod:SQUelch <numeric_value>
<numeric_value> := 30 to -150 dBm

Example: `"ADEM:SQU -10DBM"`

Features: *RST value: -40dBm
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]ADEMod:SBANd

This command selects the side band for the demodulation.

Syntax: [SENSe:]ADEMod:SBANd NORMal | INVerse
NORMal = normal position
INVerse = inverse position

Example: `"ADEM:SBAN INV"`

Features: *RST value: NORMal
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]ADEMod:RTIMe

This command selects whether the demodulation performed in real time or in blocks.

Syntax: [SENSe:]ADEMod:RTIMe ON | OFF

Example: `"ADEM:RTIM ON"`

Features: *RST value: ON
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

3.6.18.2 [SENSe:]AVERage Subsystem

The [SENSe:]AVERage subsystem calculates the average of the data acquired. A new test result is obtained from various successive measurements. The amount of test points and the axis reference of the new result correspond to those of the original measurements.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:AVERage			
:COUNt	<numeric_value>	--	
:AUTO	<Boolean>	--	
[:STATe]	<Boolean>	--	
:TYPE	MAXimum | SCALar	--	

[SENSe:]AVERage:COUNt

The command specifies the number of measurements which are combined.

Syntax: [SENSe:]AVERage:COUNt <numeric_value>
<numeric value> ::= 0 to 32767

Example: ":AVER:COUN 16"

Features: *RST value: 0
SCPI: conforming

[SENSe:]AVERage:COUNt:AUTO

AUTO ON selects a suitable number of :COUNt for the respective type of measurement.

Syntax: [SENSe:]AVERage:COUNt:AUTO ON | OFF

Example: ":AVER:COUN:AUTO ON"

Features: *RST value: OFF
SCPI: conforming

[SENSe:]AVERage[:STATe]

The command switches on or off the average function.

Syntax: [SENSe:]AVERage[:STATe] ON | OFF

Example: ":AVER OFF"

Features: *RST value: OFF
SCPI: conforming

[SENSe:]AVERage:TYPE

The command selects the type of average function.

Syntax: [SENSe:]AVERage:TYPE MAXimum | SCALar

Example: ":AVER:TYPE SCAL"

Features: *RST value: SCALar
SCPI: conforming

The following average functions have been defined:

MAXimum: $AVG(n) = MAX(X_1 \text{ to } .X_n)$

SCALar: $$AVG(n) = \frac{1}{n} \times \sum_{i=1}^{n} xi$$

3.6.18.3 SENSe:BANDwidth Subsystem

This subsystem controls the setting of the analyzer's filter bandwidths. Both groups of commands (BANDwidth and BWIDth) perform the same functions.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:BANDwidth			
[:RESolution]	<numeric_value>	HZ	
:AUTO	<Boolean>	--	
:MODE	ANALog|DIGital	--	
:FFT	<Boolean>	--	option FFT Filter
:VIDeo	<numeric_value>	HZ	
:AUTO	<Boolean>	--	
:RATio	<numeric_value> | SINe | PULSe | NOISe	--	
:DEMod	<numeric_value>	HZ	option Vector Signal Analysis
:PLL	AUTO | HIGH | MEDium | LOW		
:BWIDth			
[:RESolution]	<numeric_value>	HZ	
:AUTO	<Boolean>	--	
:MODE	ANALog|DIGital	--	
:FFT	<Boolean>	--	option FFT Filter
:VIDeo	<numeric_value>	HZ	
:AUTO	<Boolean>	--	
:DEMod	<numeric_value>	HZ	option Vector Signal Analysis
:PLL	AUTO | HIGH | MEDium | LOW		

[SENSe:]BANDwidth|BWIDth[:RESolution]

This command defines the analyzer's resolution bandwidth.

Syntax: [SENSe:]BANDwidth|BWIDth[:RESolution] <numeric_value>
<numeric_value>::= 10 Hz to 10 MHz (model 20)
1 HZ to 10 MHz (model 30)

Example: `"BAND 1MHz"`

Features: *RST value: - (AUTO is set to ON)
SCPI: conforming

The values for the resolution bandwidth are rounded in 1 | 2 | 3 | 5 steps. Bandwidths >1kHz are always analog bandwidths, bandwidths <1kHz are always realized digitally. For the bandwidth 1kHz, it is possible to select either analog or digital filters.

In the GSM BTS/MS ANALYZER mode with option FSE-K11/K10, the command is available for POWER vs. TIME measurement. In this case, the parameters DEFault (bandwidth setting according to GSM standard), 300KHZ and 1MHZ are permitted.

[SENSe:]BANDwidth|BWIDth[:RESolution]:AUTO

This command either automatically couples the resolution bandwidth of the analyzer to the span or cancels the coupling.

Syntax: [SENSe:]BANDwidth|BWIDth[:RESolution]:AUTO ON | OFF

Example: `"BAND:AUTO OFF"`

Features: *RST value: ON
SCPI: conforming

The automatic coupling matches the resolution bandwidth to the currently set span according to the relationship between span and resolution bandwidth.

[SENSe:]BANDwidth|BWIDth[:RESolution]:MODE

This command toggles between analog and digital resolution filters for the 1-kHz bandwidth.

Syntax: [SENSe:]BANDwidth|BWIDth[:RESolution]:MODE ANALog | DIGital

Example: `"BAND:MODE DIG"`

Features: *RST value: ANALog
SCPI: device-specific

Depending on the bandwidth, the resolution filters are automatically toggled between digital filters (<1kHz) and analog filters (>1kHz). The 1-kHz bandwidth is present in the instrument as a digital filter and as an analog filter and can be toggled using this command. If the analog filter is selected for the bandwidth 1kHz, the FFT-filtering for bandwidths ≤ 1kHz is switched off.

[SENSe:]BANDwidth|BWIDth[:RESolution]:MODE:FFT

This command toggles the digital filters used for bandwidths ≤ 1 kHz between ordinary mode and FFT-filter mode.

Syntax: [SENSe:]BANDwidth|BWIDth[:RESolution]:MODE:FFT ON | OFF

Example: `"BAND:MODE:FFT ON"`

Features: *RST value: OFF
SCPI: device-specific

The filter bandwidth of 1 kHz is switched to digital filtering for both ON and OFF. This command is only available in conjunction with option FFT Filter, FSE-B5.

[SENSe:]BANDwidth|BWIDth[:RESolution]:RATio

This command defines the ratio resolution bandwidth (Hz) / span (Hz).

Syntax: [SENSe:]BANDwidth|BWIDth[:RESolution]:RATio <numeric_value>
<numeric_value>::= 0.0001 to 1

Example: `"BAND:RAT 0.1"`

Features: *RST value: -- (AUTO is set to ON)
SCPI: conforming

The ratio to be entered is reciprocal to the ratio Span/RBW used in manual control.

[SENSe:]BANDwidth|BWIDth:VIDeo

This command defines the analyzer's video bandwidth.

Syntax: [SENSe:]BANDwidth|BWIDth:VIDeo <numeric_value>
<numeric_value>::= 1Hz to 10MHz

Example: "BAND:VID 10kHz"

Features: *RST value: - (AUTO is set to ON)
SCPI: conforming

The values for the video bandwidth are rounded in 1 | 2 | 3 | 5 steps.

[SENSe:]BANDwidth|BWIDth:VIDeo:AUTO

This command either automatically couples the analyzer's video bandwidth to the resolution bandwidth or cancels the coupling.

Syntax: [SENSe:]BANDwidth|BWIDth:VIDeo:AUTO ON | OFF

Example: "BAND:VID:AUTO OFF"

Features: *RST value: ON
SCPI: conforming

[SENSe:]BANDwidth|BWIDth:VIDeo:RATIO

This command defines the ratio video bandwidth (Hz) / resolution bandwidth (Hz).

Syntax: [SENSe:]BANDwidth|BWIDth:VIDeo <numeric_value> | SINe | PULSe | NOISe
<numeric_value>::= 0.001 to 1000
The parameters SINe, PULSe and NOISe may be used as synonyms for the following values: SINe: 1 PULSe: 10 NOISe:0.1

Example: "BAND:VID:RAT 10"

Features: *RST value: - (AUTO is set to ON)
SCPI: conforming

The ratio to be entered is reciprocal to the ratio RBW/VBW used in manual control.

[SENSe:]BANDwidth|BWIDth:DEMod

This command defines the demodulation bandwidth of the analyzer for analog demodulation.

Syntax: [SENSe:]BANDwidth|BWIDth:DEMod <numeric_value>
<numeric_value>::= 5 kHz to 200 kHz (Real Time on)
5 kHz to 5 MHz (Real Time off)

Example: "BAND:DEM 100KHZ"

Features: *RST value: 10KHZ
SCPI: device-specific

The values for the demodulation bandwidth are rounded in steps of 1 | 2 | 3 | 5. The command is valid only in conjunction with option Vector Signal Analysis, FSE-B7, and for analog demodulation.

[SENSe:]BANDwidth|BWIDth:PLL

This command defines the bandwidth of the main PLL of the analyzer synthesizer.

Syntax: [SENSe:]BANDwidth|BWIDth:PLL AUTO|HIGH|MEDium|LOW

Example: "BAND:PLL HIGH"

Features: *RST value: AUTO
SCPI: device-specific

3.6.18.4 SENSe:CORRection-Subsystem

The SENSe:CORRection-subsystem controls the correction of measured results by means of frequency-dependent correction factors (e. g. for antenna or cable attenuation).
It also controls calibration and normalization during operation with the option tracking generator (FSE-B8 to FSE-B11).

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:CORRection			option Tracking Generator
:METHod	TRANsmission | REFLexion		
:COLLect			
[:ACQuire]	THRough | OPEN		no query
[:STATe]	<Boolean>		
:RECall			no query
:TRANsducer			
:SELect	<name>		
:UNIT	<string>		
:SCALing	LINear | LOGarithmic		
:DATA	<freq> , <level> ..	HZ , --	
[:STATe]	<Boolean>		
:DELete	--	--	no query
:TSET			
:SELect	<name>		
:UNIT	<string>		
:RANGe<1 to 10>	<freq> , <freq>, <name> ..	HZ, HZ, --	
[:STATe]	<Boolean>		
:DELete	--	--	no query
:LOSS			option FSE-K11 or FSE-K10
:INPut			
[:MAGNitude]	<numeric_value>	DB	
:RXGain			option FSE-K11
:INPut			
[:MAGNitude]	<numeric_value>	DB	

[SENSe:]CORRection[:STATe]

This command activates/deactivates normalization of the measurement results.

Syntax: [SENSe:]CORRection[:STATe] ON | OFF

Example: "CORR ON "

Features: *RST value: OFF
SCPI: conforming

This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B12.

[SENSe:]CORRection:METHod

This command selects the kind of measurement with active tracking generator (transmission/reflexion).

Syntax: [SENSe:]CORRection:METHod TRANsmission | REFLexion

Example: "CORR:METH TRAN "

Features: *RST value: TRANsmission
SCPI: device specific

This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B12.

[SENSe:]CORRection:COLLect[:ACQuire]

This command selects the kind of measurement for the reference values of the normalization (response calibration).

Syntax: [SENSe:] CORRection:COLLect[:ACQuire] THRough | OPEN

Example: "CORR:COLL THR"

Features: *RST value:
SCPI: conforming

THRough	"TRANsmission" mode: calibration with direct connection between tracking generator and device input. "REFLexion" mode: calibration with short circuit at the input
OPEN	only valid in "REFLexion" mode:calibration with open input

This command is an event which is why it is not assigned an *RST value an a query. It is only valid in conjunction with option Tracking Generator, FSE-B8 to B12.

[SENSe:]CORRection:RECall

This command restores the instrument setting that was valid for the measurement of the reference data. It is only valid in conjunction with option Tracking Generator, FSE-B8 to B12.

Syntax: [SENSe:] CORRection:RECall

Example: "CORR:REC"

Features: *RST value: -
SCPI: conforming

This command is an event which is why it is not assigned an *RST value and a query. It is only valid in conjunction with option Tracking Generator, FSE-B8 to B12.

[SENSe:]CORRection:TRANsducer:SELect

This command selects the transducer factor designated by <name>. If <name> does not exist yet, a new transducer factor is created.

Syntax: [SENSe:]CORRection:TRANsducer:SELect <name>
<name>::= Name of the transducer factor in string data form with a maximum of 8 characters.

Example: `"CORR:TRAN:SEL 'FACTOR1'"`

Features: *RST value: -
SCPI: device-specific

This command must be sent prior to the subsequent commands for modifying/activating transducer factors.

[SENSe:]CORRection:TRANsducer:UNIT

This command defines the unit of the transducer factor selected.

Syntax: [SENSe:]CORRection:TRANsducer:UNIT <string>
<string>::= 'DB' | 'DBM' | 'DBMV' | 'DBUV' | 'DBUV/M' | 'DBUA' 'DBUA/M' | 'DBPW' | 'DBPT'

Example: `"CORR:TRAN:UNIT 'DBUV'"`

Features: *RST value: 'DB'
SCPI: device-specific

Prior to this command, the command `SENS:CORR:TRAN:SEL` must be sent.

[SENSe:]CORRection:TRANsducer:SCALing

This command defines whether the frequency scaling of the transducer factor is linear or logarithmic.

Syntax: [SENSe:]CORRection:TRANsducer:SCALing LINear|LOGarithmic

Example: `"CORR:TRAN:SCAL LOG"`

Features: *RST value: LINear
SCPI: device-specific

Prior to this command, the command `SENS:CORR:TRAN:SEL` must be sent.

[SENSe:]CORRection:TRANsducer:DATA

This command defines the test points for the selected transducer factor. The values are entered as a series of frequency/level pairs. The frequencies must be in ascending order.

Syntax: [SENSe:]CORRection:TRANsducer:DATA <freq>,<level>..

Example: `"CORR:TRAN:TRANsducer:DATA 1MHZ,-30,2MHZ,-40"`

Features: *RST value: -
SCPI: device-specific

Prior to this command, the command `SENS:CORR:TRAN:SEL` must be sent. The level values are sent as dimensionless numbers; the unit is specified by means of the command `SENS:CORR:TRAN:UNIT`.

[SENSe:]CORRection:TRANsducer[:STATe]

This command switches the selected transducer factor on or off.

Syntax: [SENSe:]CORRection:TRANsducer[:STATe] ON | OFF

Example: `"CORR:TRAN ON"`

Features: *RST value: OFF
SCPI: device-specific

Prior to this command, the command `SENS:CORR:TRAN:SEL` must be sent.

[SENSe:]CORRection:TRANsducer:DELete

This command deletes the selected transducer factor.

Syntax: [SENSe:]CORRection:TRANsducer:DELete

Example: `"[SENSe:]CORR:TRAN:DEL"`

Features: *RST value: -
SCPI: device-specific

This command is an event and therefore has no *RST value.
Prior to this command, the command `SENS:CORR:TRAN:SEL` must be sent.

[SENSe:]CORRection:TSET:SELect

This command selected the transducer set designated by <name>. If <name> does not exist yet, a new set is created.

Syntax: [SENSe:]CORRection:TSET:SELect <name>
<name>::= name of the transducer set in string data form with a maximum of 8 characters.

Example: `"CORR:TSET:SEL 'SET1'"`

Features: *RST value: -
SCPI: device-specific

This command must be sent prior to the subsequent commands for changing/activating the transducer sets.

[SENSe:]CORRection:TSET:UNIT

This command defines the unit of the selected transducer sets. When assigning transducer factors to the set, only factors which are compatible to the selected unit, i. e. factors with the same unit or the unit dB, are allowed.

Syntax: [SENSe:]CORRection:TSET:UNIT <string>
<string>::= 'DB' | 'DBM' | 'DBUV' | 'DBUV/M' | 'DBUA' 'DBUA/M" | DBPW' | 'DBPT'

Example: `"CORR:TSET:UNIT 'DBUV'"`

Features: *RST value: 'DB'
SCPI: device-specific

Prior to this command, the command `SENS:CORR:TSET:SEL` must be sent.

[SENSe:]CORRection:TSET:RANGe<1 to 10>

This command defines a partial range of the selected transducer set. The partial range is determined by its start and stop frequencies plus a list of names of the assigned transducer factors. The ranges 1 to 10 must be sent in ascending order.

Syntax: [SENSe:]CORRection:TSET:RANGe<1 to 10> <freq>,<freql>,<name>..
<freq>,<freq>::= start frequency, stop frequency of the range
<name>...::= list of names for the assigned transducer factors. The individual names must be characterized by single quotation marks (') and separated by commas.

Example: `"CORR:TRAN:TSET:RANG 1MHZ,2MHZ,'FACTOR1,'FACTOR2'"`

Features: *RST value: -
SCPI: device-specific

Prior to this command, the command `SENS:CORR:TSET:SEL` must be sent.

[SENSe:]CORRection:TSET[:STATe]

This command switches the selected transducer set on or off.

Syntax: [SENSe:]CORRection:TSET[:STATe] ON | OFF

Example: `"CORR:TSET ON"`

Features: *RST value: OFF
SCPI: device-specific

Prior to this command, the command `SENS:CORR:TSET:SEL` must be sent.

[SENSe:]CORRection:TSET:DELete

This command deletes the selected transducer set.

Syntax: [SENSe:]CORRection:TSET:DELete

Example: "[SENSe:]CORR:TSET:DEL"

Features: *RST value: -
SCPI: device-specific

This command is an event and thus has no *RST value assigned.
Prior to this command, the command SENS:CORR:TSET:SEL must be sent.

[SENSe:]CORRection:LOSS:INPut[:MAGNitude]

This command announces to the instrument a possibly needed external attenuation of the input signal, so that it is taken into account later when the level is set.

Syntax: [SENSe:]CORRection:LOSS:INPut[:MAGNitude] <numeric_value>
with <numeric_value>::= value of external attenuation in dB.

Example: "[SENSe:]CORR:LOSS:INP 30DB "

Features: *RST value: 20dB
SCPI: device-specific

The external attenuation must be selected such that the input power of the analyzer does not exceed 27 dBm.
The command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

[SENSe:]CORRection:RXGain:INPut[:MAGNitude]

This command announces to the instrument a possibly needed preamplification in the RX-band (RX BAND GAIN), so that it is taken into account later when the measured values are read out.

Syntax: [SENSe:]CORRection:RXGain:INPut[:MAGNitude] <numeric_value>
with <numeric_value>::= value of the amplification in dB.

Example: "[SENSe:]CORR:RXG:INP 30DB "

Features: *RST value: 0 dB
SCPI: device-specific

The command is available only in conjunction with options GSM BTS/MS Analyzer, FSE-K11/K10, and for spurious emission or modulation spectrum measurement (K11 only).

3.6.18.5 SENSe:DETector Subsystem

The SENSe:DETector subsystem controls the recording of measurement values via the type of detector selected for each trace.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:DETector			
[:FUNCtion]	APEak | NEGative| POSitive | SAMPle| RMS | AVERage	--	
:AUTO	<Boolean>		

[SENSe:]DETector[:FUNCtion]

This command switches the detector for recording of the measured value.

Syntax: [SENSe:]DETector[:FUNCtion] APEak \|NEGative \| POSitive \| SAMPle \| RMS \| AVERage

Example: `"DET POS"`

Features: *RST value: APEak
SCPI: conforming

The value "APEak" (AutoPeak) displays both the positive peak value and the negative peak value when noise is present. The positive peak value is displayed when one signal is present.

[SENSe:]DETector[:FUNCtion]:AUTO

This command either couples the detector to the current trace setting or turns coupling off.

Syntax: [SENSe:]DETector[:FUNCtion]:AUTO ON \| OFF

Example: `"DET:AUTO OFF"`

Features: *RST value: ON
SCPI: conforming

3.6.18.6 SENSe:DDEMod Subsystem

This subsystem controls the parameters for digital demodulation and is only active in conjunction with operating mode Vector Signal Analysis (option FSE-B7).

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:DDEMod			Vector Signal Analysis
:FORMat	QPSK | PSK | MSK | QAM | FSK		
:SBANd	NORMal | INVerse		
:QPSK			
:FORMat	NORMal | DIFFerential | OFFSet | DPI4		
:PSK			
:NSTate	2 | 8		
:FORMat	NORMal | DIFFerential		
:MSK			
:FORMat	TYPE1 | TYPE2 | NORMal | DIFFerential		
:QAM			
:NSTate	16		
:FSK			
:NSTate	2 | 4		
:SRATe	<numeric_value>	HZ	
:TIMe	<numeric_value>	SYM	
:PRATe	1 | 2 | 4 | 8 | 16		
:FILTer			
:MEASurement	OFF | RCOSine | RRCosine | GAUSsian		
:REFerence	RCOSine | RRCosine | GAUSsian		
:ALPHa	<numeric_value>		
:NORMalize	<Boolean>		
:PRESet	GSM | TETRa | DCS1800 | PCS1900 | PHS | PDCup | PDCDown | APCO25CQPSK | APCO25C4FM | CDPD | DECT | CT2 | ERMes | MODacom | PWT | TFTS | F16 | F322 | F324 | F64 | FQCDma | RQCDma | FNADc | RNADc		
:SEARch			
:PULSe			
:STATe	<Boolean>		
:SYNC			
:OFFSet	<numeric_value>	SYM	
:PATTern	<string>		
:STATe	<Boolean>		
:TIME	<numeric value>	SYM	
:TCAPture			Vector Signal Analysis
:LENGth	<numeric_value>		

[SENSe:]DDEMod:FORMat

This command selects the digital demodulation type.

Syntax: [SENSe:]DDEMod:FORMat QPSK | PSK | MSK | QAM | FSK

Example: "DDEM:FORM QPSK"

Features: *RST value: MSK
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:SBANd

This command selects the sideband for the demodulation.

Syntax: [SENSe:]DDEMod:SBANd NORMal | INVerse
NORMal = normal position
INVerse = inverse position

Example: "DDEM:SBAN INV"

Features: *RST value: NORMal
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:QPSK:FORMat

This command determines the specific demodulation type for QPSK.

Syntax: [SENSe:]DDEMod:QPSK:FORMat NORMal | DIFFerential | OFFSet | DPI4

Example: "DDEM:QPSK:FORM DPI4"

Features: *RST value: -
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:PSK:NSTate

This command determines the specific demodulation type for PSK.

Syntax: [SENSe:]DDEMod:PSK:NSTate 2 | 8

Example: "DDEM:PSK:NST 2"

Features: *RST value: -
SCPI: device-specific

Value 2 (i.e. PSK2) corresponds to BPSK demodulation, value 8 the 8PSK demodulation. This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:PSK:FORMat

This command determines the specific demodulation type for PSK.

Syntax: [SENSe:]DDEMod:PSK:FORMat NORMal | DIFFerential

Example: "DDEM:PSK:FORM DIFF"

Features: *RST value: -
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:MSK:FORMat

This command determines the specific demodulation type for MSK.

Syntax: [SENSe:]DDEMod:MSK:FORMat TYPE1 | TYPE2 | NORMal | DIFFerential

Example: "DDEM:MSK:FORM TYPE2"

Features: *RST value: TYPE2 | DIFFerential
SCPI: device-specific

TYPE1 | NORMal corresponds to MSK demodulation, TYPE2 | DIFFerential corresponds to DMSK demodulation. This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:QAM:NSTate

This command determines the specific demodulation type for QAM.

Syntax: [SENSe:]DDEMod:QAM:NSTate 16

Example: "DDEM:QAM:NST 16"

Features: *RST value: 16
SCPI: device-specific.

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:FSK:NSTate

This command determines the specific demodulation type for FSK.

Syntax: [SENSe:]DDEMod:FSK:NSTate 2 | 4

Example: "DDEM:FSK:NST 2"

Features: *RST- value: -
SCPI: device-specific

The parameter 2 corresponds to the demodulation type 2FSK, the parameter 4 to the demodulation type 4FSK.This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:SRATe

This command defines the symbol rate.

Syntax: [SENSe:]DDEMod:SRATe <numeric_value>
<numeric value> ::= 160 Hz to 1.6 MHz

Example: "DDEM:SRAT 18kHz"

Features: *RST value: 270.833333kHz
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:TIME

The command determines the number of displayed symbols (result length).

Syntax: [SENSe:]DDEMod:TIME <numeric_value>
<numeric value> ::= 1 to Frame Length

Example: "DDEM:TIME 80"

Features: *RST value: 147
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:PRATe

This command determines the number of points per symbol.

Syntax: [SENSe:]DDEMod:PRATe 1 | 2 | 4 | 8 | 16

Example: "DDEM:PRAT 8"

Features: *RST value: 4
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:FILTer:MEASurement

This command selects the input filter for the test signal.

Syntax: [SENSe:]DDEMod:FILTer:MEASurement
OFF | RCOSine | RRCosine | GAUSsian

Example: "DDEM:FILT:MEAS RCOS"

Features: *RST value: OFF
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:FILTer:REFerence

This command selects the input filter for the reference signal.

Syntax: [SENSe:]DDEMod:FILTer:REFerence
RCOSine | RRCosine | GAUSsian

Example: "DDEM:FILT:REF RCOS"

Features: *RST value: GAUSsian
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:FILTer:ALPHa

This command determines the filter characteristic (ALPHA/BT).

Syntax: [SENSe:]DDEMod:FILTer:ALPHa <numeric_value>
<numeric_value>::= 0.2 to 1 (step width 0.05)

Example: "DDEM:FILT:ALPH 0.5"

Features: *RST value: 0.3
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:NORMalize

This command switches normalizing of the unit circle on or off using IQ offset.

Syntax: [SENSe:]DDEMod:NORMalize ON | OFF

Example: "DDEM:NORM OFF"

Features: *RST value: ON
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:SEARch:PULSe:STATe

This command switches the signal burst search on or off.

Syntax: [SENSe:]DDEMod:SEARch:PULSe:STATe ON | OFF

Example: "DDEM:SEAR:PULS:STAT OFF"

Features: *RST value: ON
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:SEARch:SYNC:OFFSet

This command defines the offset of the display with reference to the synchronization sequence.

Syntax: [SENSe:]DDEMod:SEARch:SYNC:OFFSET <numeric_value>

Example: "DDEM:SEAR:SYNC:OFFS 10SYM"

Features: *RST value: 0 SYM
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:SEARch:SYNC:PATTern

This command defines the synchronization sequence.

Syntax: [SENSe:]DDEMod:SEARch:SYNC:PATTern <string>

Example: "DDEM:SEAR:SYNC:PATT "1101001"

Features: *RST value: ""
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:SEARch:SYNC:STATe

This command switches the search for a synchronization sequence on or off.

Syntax: [SENSe:]DDEMod:SEARch:SYNC:STATe ON | OFF

Example: "DDEM:SEARch:SYNC:STAT ON"

Features: *RST value: OFF
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:SEARch:TIME

This command determines the number of symbols required for demodulation (frame length). The values > 800 are only permissible if the number of points per symbol is <16, the values > 1600 only if the number of points per symbol is <8.

Syntax: [SENSe:]DDEMod:SEARch:TIME 100 to 1600 (step width = 100)

Example: `"DDEM:SEAR:TIME 800"`

Features: *RST value: 400
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]DDEMod:PRESet

This command selects an automatic setting of all modulation parameters according to a standard transmission method.

Syntax: [SENSe:]DDEMod:PRESet GSM | TETRa | DCS1800 | PCS1900 | PHS | PDCup | PDCDown | APCO25CQPSK | APCO25C4FM | CDPD | DECT | CT2 | ERMes | MODacom | PWT | TFTS | F16 | F322 | F324 | F64 | FQCDma | RQCDmal FNADc | RNADc

Example: `"DDEM:PRES TETR"`

Features: *RST value: GSM
SCPI: device-specific

FQCDma	Forward CDMA according to IS95 standard
RQCDma	Reverse CDMA according to IS95 standard
F16	FLEX 1600 - 2FSK
F322	FLEX 3200 - 2FSK
F324	FLEX 3200 - 4FSK
F64	FLEX 6400 - 4FSK

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

[SENSe:]TCAPture:LENGth

This command determines the number of sampling points that are written into the memory for each measurement (memory size).

Syntax: [SENSe:]TCAPture:LENGth 1024 | 2048 | 4096 | 8192 | 16384

Example: `"TCAP:LENG 1024"`

Features: *RST value: 16384
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for digital demodulation.

3.6.18.7 SENSe:FILTer Subsystem

The SENSe:FILTer subsystem selects the filters in the video signal path. This subsystem is active only in the Vector Signal Analysis mode (option FSE-B7).

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:FILTer			Vector Signal Analyzer
:HPASs			
[:STATe]	<Boolean>	--	
:FREQuency	<numeric_value>	HZ	
:LPASs			Vector Signal Analyzer
[:STATe]	<Boolean>	--	
:FREQuency	<numeric_value>	HZ | PCT	
:CCITt			
[:STATe]	<Boolean>	--	
:CMESsage			
[:STATe]	<Boolean>	--	
:DEMPhasis			
[:STATe]	<Boolean>		
:TCONstant	<numeric_value>	S	
:LINK	DISPlay | AUDio		

[SENSe:]FILTer:HPASs[:STATe]

This command activates the high-pass filter in the AF-branch for analog demodulation.

Syntax: [SENSe:]FILTer:HPASS[:STATe] ON | OFF

Example: `"FILT:HPAS ON"`

Features: *RST value: OFF
SCPI: conforming

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]FILTer:HPASs:FREQuency

In the Vector Signal Analysis mode with analog demodulation, this command defines the frequency limit of the high-pass filter in the AF-branch. For REAL TIME ON absolute frequencies are entered, for REAL TIME OFF, the frequencies are entered relative to the demodulation bandwidth.

Syntax: [SENSe:]FILTer:HPASs:FREQuency <numeric_value>
<numeric_value> ::= 10 Hz | 100 Hz | 1 kHz | 1 MHz (signal analysis)
30 Hz | 300 kHz (vector signal analysis)

Example:
```
"FILT:HPAS:FREQ 100HZ"
"FILT:HPAS:FREQ 30HZ"
```

Features: *RST value: - (STATe = OFF)
SCPI: conforming

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]FILTer:LPASs[:STATe]

This command activates the low-pass filter in the AF-branch with analog demodulation.

Syntax: [SENSe:]FILTer:LPASS[:STATe] ON | OFF

Example: "FILT:LPAS ON"

Features: *RST value: OFF
SCPI: conforming

On switching to ON, a bandwidth of 3 kHz for REAL TIME ON and a bandwidth of 5 PCT for REAL TIME OFF is set automatically. This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]FILTer:LPASs:FREQuency

This command defines the frequency limit of the low-pass filter in the NF-branch for analog demodulation.

Syntax: [SENSe:]FILTer:LPASs:FREQuency <numeric_value>
<numeric_value> ::= 3 kHz | 15 kHz bei REAL TIME ON
5 PCT | 10 PCT | 25 PCT bei REAL TIME OFF

Example: "FILT:LPAS:FREQ 3KHZ" for REAL TIME ON
"FILT:LPAS:FREQ 25PCT" for REAL TIME OFF

Features: *RST value: - (STATe = OFF)
SCPI: conforming

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]FILTer:CCITt[:STATe]

This command activates the weighting filter according to CCITT-recommendation in the AF-branch for analog demodulation.

Syntax: [SENSe:]FILTer:CCITt[:STATe] ON | OFF

Example: "FILT:CCIT ON"

Features: *RST value: OFF
SCPI: conforming

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]FILTer:CMESsage[:STATe]

This command activates the C-message weighting filter according to CCITT-recommendation in the AF-branch for analog demodulation.

Syntax: [SENSe:]FILTer:CMESsage[:STATe] ON | OFF

Example: "FILT:CMES ON"

Features: *RST value: OFF
SCPI: conforming

This command is valid only in the Vector Signal Analysis mode and for analog demodulation with REAS TIME OFF.

[SENSe:]FILTer:DEMPhasis[:STATe]

This command activates the selected de-emphasis for analog demodulation.

Syntax: [SENSe:]FILTer:DEMPhasis[:STATe] ON | OFF

Example: `"FILT:DEMP ON"`

Features: *RST value: OFF
SCPI: conforming

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]FILTer:DEMPhasis:TCONstant

This command sets the time constant of the de-emphasis for analog demodulation.

Syntax: [SENSe:]FILTer:DEMPhasis:TCONstant 50US | 75US | 750US

Example: `"FILT:DEMP:TCON 75US"`

Features: *RST value: 50us
SCPI: conforming

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]FILTer:DEMPhasis:LINK

For analog demodulation, this command selects whether the de-emphasis set is to be active in the audio branch only or in addition for the display of measured values.

Syntax: [SENSe:]FILTer:DEMPhasis:LINK DISPlay | AUDio
AUDio::= De-emphasis effective in the audio branch only
DISPlay::= De-emphasis effective in the audio branch and in the display of measured values

Example: `"FILT:DEMP:LINK DISP"`

Features: *RST value: AUDio
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

3.6.18.8 SENSe:FREQuency Subsystem

The SENSe:FREQuency subsystem defines the frequency axis of the active display. The frequency axis can either be defined via the start/stop frequency or via the center frequency and span.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:FREQuency			
:CENTer	<numeric_value>	HZ	
:LINK	STARt | STOP | SPAN	--	
:STEP	<numeric_value>	HZ	
:LINK	SPAN | RBW | OFF	--	
:FACTor	<numeric_value>	PCT	
:SPAN	<numeric value>	HZ	
:FULL	--	--	
:LINK	CENTer | STARt | STOP	--	
:STARt	<numeric_value>	HZ	
:LINK	CENTer | STOP | SPAN	--	
:STOP	<numeric_value>	HZ	
:LINK	CENTer | STAR t |SPAN	--	
:MODE	CW | FIXed | SWEep	--	
:OFFSet	<numeric_value>	HZ	

[SENSe:]FREQuency:CENTer

This command defines the center frequency of the analyzer.

Syntax: [SENSe:]FREQuency:CENTer <numeric_value>
<numeric_value>::= 0 GHz to f_{max}

Example: `"FREQ:CENT 100MHz"`

Features: *RST value: f_{max} / 2
SCPI: conforming

The automatic coupling of the parameters is set to SPAN FIXED.

[SENSe:]FREQuency:CENTer:LINK

This command defines the coupling of the center frequency to the start, stop frequency or the frequency span.

Syntax: [SENSe:]FREQuency:CENTer:LINK STARt | STOP | SPAN

Example: `"FREQ:CENT:LINK STAR"`

Features: *RST value: SPAN
SCPI: device-specific

[SENSe:]FREQuency:CENTer:STEP

This command defines the step width of the center frequency.

Syntax: [SENSe:]FREQuency:CENTer:STEP <numeric_value>
<numeric_value>::= 0 to f_{max}

Example: "FREQ:CENT:STEP 120MHz"

Features: *RST value: - (AUTO 0.1 × SPAN is switched on)
SCPI: conforming

[SENSe:]FREQuency:CENTer:STEP:LINK

This command couples the step width of the center frequency to span (span >0) or to the resolution bandwidth (span = 0) or cancels the couplings.

Syntax: [SENSe:]FREQuency:CENTer:STEP:LINK SPAN | RBW | OFF

Example: "FREQ:CENT:STEP:LINK SPAN"

Features: *RST value: SPAN
SCPI: device-specific

[SENSe:]FREQuency:CENTer:STEP:LINK:FACTor

This command couples the step width of the center frequency with a factor to the span (span >0) or to the resolution bandwidth (span = 0).

Syntax: [SENSe:]FREQuency:CENTer:STEP:LINK:FACTor <numeric_value>
<numeric_value>::= 1 to 100 PCT

Example: "FREQ:CENT:STEP:LINK:FACT 20PCT"

Features: *RST value: - (AUTO 0.1 × SPAN is switched on)
SCPI: device-specific

[SENSe:]FREQuency:SPAN

This command defines the frequency span of the analyzer.

Syntax: [SENSe:]FREQuency:SPAN <numeric_value>
<numeric_value>::= 0 GHz to f_{max}

Example: "FREQ:SPAN 10MHz"

Features: *RST value: f_{max}
SCPI: conforming

The automatic coupling of the parameters is set to CENTER FIXED.

[SENSe:]FREQuency:SPAN:FULL

This command sets the maximum frequency span of the analyzer.

Syntax: [SENSe:]FREQuency:SPAN:FULL

Example: "FREQ:SPAN:FULL"

Features: *RST value: -
SCPI: conforming

This command is an event which is why it is not assigned an *RST value and has no query.

[SENSe:]FREQuency:SPAN:LINK

This command defines the coupling for frequency-span changes.

Syntax: [SENSe:]FREQuency:SPAN:LINK CENTer | START | STOP

Example: "FREQ:SPAN:LINK STOP"

Features: *RST value: CENTer
SCPI: conforming

[SENSe:]FREQuency:STARt

This command defines the start frequency of the analyzer.

Syntax: [SENSe:]FREQuency:STARt <numeric_value>
<numeric_value>::= 0 GHz to f_{max}

Example: "FREQ:STAR 20MHz"

Features: *RST value: 0
SCPI: conforming

The automatic coupling of the parameters is set to STOP FIXED.

[SENSe:]FREQuency:STARt:LINK

This command defines the coupling for start-frequency changes.

Syntax: [SENSe:]FREQuency:STARt:LINK CENTer | STOP | SPAN

Example: "FREQ:STAR:LINK SPAN"

Features: *RST value: STOP
SCPI: device-specific

[SENSe:]FREQuency:STOP

This command defines the stop frequency of the analyzer.

Syntax: [SENSe:]FREQuency:STOP <numeric_value>
<numeric_value>::= 0 GHz to f_{max}

Example: `"FREQ:STOP 2000MHz"`

Features: *RST value: f_{max}
SCPI: conforming

The automatic coupling of the parameters is set to STARt FIXED.

[SENSe:]FREQuency:STOP:LINK

This command defines the coupling for stop-frequency changes.

Syntax: [SENSe:]FREQuency:STOP:LINK CENTer | STARt | SPAN

Example: `"FREQ:STOP:LINK SPAN"`

Features: *RST value: STARt
SCPI: device-specific

[SENSe:]FREQuency:MODE

This command determines which command groups are used for setting the frequency of the analyzer.

Syntax: [SENSe:]FREQuency:MODE CW | FIXed | SWEep

Example: "FREQ:MODE SWE"

Features: *RST value: SWE
SCPI: conforming

For CW and FIXed, the frequency setting is via command `FREQuency:CW`. In the SWEep mode, the setting is via commands `FREQuency:STARt`, `STOP`, `CENTer` and `SPAN`.

[SENSe:]FREQuency:OFFSet

This command defines the frequency offset of the analyzer.

Syntax: [SENSe:]FREQuency:OFFSet <numeric_value>

Example: `"FREQ:OFFS 1GHZ"`

Features: *RST value: 0 Hz
SCPI: conforming

3.6.18.9 SENSe:MSUMmary Subsystem

This subsystem controls the modulation summary setting for analog demodulation. It is active only in conjunction with option Vector Analysis, FSE-B7.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe<1|2>]			
:MSUMmary			Vector Signal Analysis
:AHOLd			
[:STATe]	<Boolean>		
:MODE	ABSolute | RELative		
:REFerence	<numeric_value>	PCT | HZ | DEG | RAD	
:AUTO	ONCE		no query
:MTIMe	<numeric_value>	S	

[SENSe:]MSUMmary:AHOLd[:STATe]

This command switches on the average/peak hold mode.

Syntax: [SENSe:]MSUMmary:AHOLd[:STATe]ON | OFF

Example: `"MSUM:AHOL ON"`

Features: *RST value: OFF
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]MSUMmary:MODE

This command selects the absolute or relative indication of the summary marker values.

Syntax: [SENSe:]MSUMmary:MODE ABSolute | RELative

Example: `"MSUM:MODE REL"`

Features: *RST value: ABSolute
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]MSUMmary:REFerence

This command selects the reference modulation.

Syntax: [SENSe:]MSUMmary:REFerence <numeric_value>
<numeric_value> :=
0.001PCT to 1000PCT for AM
0.1HZ to 10MHZ for FM
0.0001RAD to 1000RAD for PM

Example: `"MSUM:REF 50PCT"`

Features: *RST value: 100PCT for AM
100KHZ for FM
10RAD for PM
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]MSUMmary:REFerence:AUTO

This command sets the current absolute measured values of the main modulation signal as reference values for the relative indication.

Syntax: [SENSe:]MSUMmary:REFerence:AUTO ONCE

Example: `"MSUM:REF:AUTO ONCE"`

Features: *RST value: --
SCPI: device-specific

This command is an event and has therefore no query and no *RST value assigned. This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

[SENSe:]MSUMmary:MTIMe

This command selects the measurement time for the summary markers.

Syntax: [SENSe:]MSUMmary:MTIMe <numeric_value>
<numeric_value> := 0.1 s | 1 s

Example: `"MSUM:MTIM 100US"`

Features: *RST value: 0.1S
SCPI: device-specific

This command is valid only in the Vector Signal Analysis mode and for analog demodulation.

3.6.18.10 SENSe:POWer Subsystem

This subsystem controls the setting of the analyzer's power measurements.

COMMAND	PARAMETER	UNIT	COMMENT
[SENSe<1|2>]			
:POWer			
:ACHannel			
:SPACing			
[:UPPer]	<numeric_value>	HZ	
:ACPairs	1 | 2 | 3		
:BANDwidth			
[:CHANnel]	<numeric_value>	HZ	
:ACHannel	<numeric_value>	HZ	
:ALTernate<1|2>	<numeric_value>	HZ	
:BWIDth			
[:CHANnel]	<numeric_value>	HZ	
:ACHannel	<numeric_value>	HZ	
:ALTernate<1|2>	<numeric_value>	HZ	
:MODE	ABSolute | RELative		
:REFerence			
:AUTO	ONCE		no query
:PRESet	ACPower | CPOWer | OBANdwidth | OBWidth | CN | CN0		
:BANDwidth	<numeric_value>	PCT	
:BWIDth	<numeric_value>	PCT	

[SENSe:]POWer:ACHannel:SPACing[:UPPer]

This command defines the channel spacing of adjacent channel to carrier.

Syntax: [SENSe:]POWer:ACHannel:SPACing[:UPPer] <numeric_value>
<numeric_value>::= 0 Hz to 1000 MHz

Example: "POW:ACH:SPAC 28kHz"

Features: *RST value: 24 kHz
SCPI: conforming

[SENSe:]POWer:ACHannel:ACPairs

This command sets the number of adjacent channels (upper and lower channel in pairs).

Syntax: [SENSe:]POWer:ACHannel:ACPairs 1.| 2 | 3

Example: "POW:ACH:ACP 3"

Features: *RST value: 1
SCPI: device-specific

[SENSe:]POWer:ACHannel:BANDwidth|BWIDth[:CHANnel]

This command sets the channel bandwidth of the radio communication system.

Syntax: [SENSe:]POWer:ACHannel:BANDwidth|BWIDth[:CHANnel] <numeric_value>
<numeric_value>::= 0 Hz to 1000 MHz

Example: `"POW:ACH:BWID 30kHz"`

Features: *RST value: 24 kHz
SCPI: device-specific

If the channel bandwidth of the adjacent channel is changed the bandwiths of all alternate adjacent channels are automatically set to the same value.

[SENSe:]POWer:ACHannel:BANDwidth|BWIDth:ACHannel

This command defines the channel bandwidth of the adjacent channel of the radio transmission system.

Syntax: [SENSe:]POWer:ACHannel:BANDwidth|BWIDth:ACHannel <numeric_value>
<numeric_value>::= 0 Hz to 1000 MHz

Example: `"POW:ACH:BWID:ACH 30kHz"`

Features: *RST value: 24 kHz
SCPI: device-specific

If the channel bandwidth of the adjacent channel is changed the bandwiths of all alternate adjacent channels are automatically set to the same value.

[SENSe:]POWer:ACHannel:BANDwidth|BWIDth:ALTernate<1|2>

This command defines the channel bandwidth of the first/second alternate adjacent channel of the radio transmission system.

Syntax: [SENSe:]POWer:ACHannel:BANDwidth|BWIDth:ALTernate<1|2>
<numeric_value>
<numeric_value>::= 0 Hz to 1000 MHz

Example: `"POW:ACH:BWID:ALT2 30kHz"`

Features: *RST value: 24 kHz
SCPI: device-specific

If the channel bandwidth of the alternate adjacent channel no. 1is changed the bandwith of the alternate adjacent channel no. 2 is automatically set to the same value.

[SENSe:]POWer:ACHannel:MODE

This command toggles between absolute and relative measurement.

Syntax: [SENSe:]POWer:ACHannel:MODE ABSolute | RELative

Example: `"POW:ACH:MODE REL"`

Features: *RST value: ABSolute
SCPI: device-specific

For the relative measurement the reference value is set to the currently measured channel power by command `POW:ACH:REF:AUTO ONCE`.

[SENSe:]POWer:ACHannel:REFerence:AUTO

This command sets the reference value to the currently measured channel power.

Syntax: [SENSe:]POWer:ACHannel:REFerence:AUTO ONCE

Example: `"POW:ACH:REF:AUTO ONCE"`

Features: *RST value: -
SCPI: device-specific

This command is an event which is why it is not assigned an *RST value and has no query.

[SENSe:]POWer:ACHannel:PRESet

This command selects the type of power measurement.

Syntax: [SENSe:]POWer:ACHannel:PRESet
ACPower | CPOWer | OBANdwidth|OBWidth | CN | CN0

Example: `"POW:ACH:REF:PRES ACP"`

Features: *RST value: -
SCPI: device-specific

[SENSe:]POWer:BANDwidth|BWIDth

This command defines the percentage of the power with respect to the total power.

Syntax: [SENSe:]POWer:ACHannel:BANDwidth|BWIDth 0 to 100PCT

Example: `"POW:BWID 95PCT"`

Features: *RST value: 99PCT
SCPI: device-specific

This value defines the occupied bandwidth (measurement `POW:ACH:PRES OBW`).

3.6.18.11 SENSe:ROSCillator Subsystem

This subsystem controls the reference oscillator.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:ROSCillator			
:SOURce	INTernal | EXTernal	--	
:EXTernal			
:FREQuency	<numeric_value>	HZ	
[:INTernal]			
:TUNe	<numeric_value>		
:SAVe			no query

[SENSe:]ROSCillator:SOURce

This command controls selection of the reference oscillator.

Syntax: [SENSe:]ROSCillator:SOURce INTernal | EXTernal

Example: `"ROSC:SOUR EXT"`

Features: *RST value: –
SCPI: conforming

If the external reference oscillator is selected, the reference signal must be connected to the rear panel of the instrument. *RST has no influence on this setting.

[SENSe:]ROSCillator:EXTernal:FREQuency

This command defines the frequency of the external reference oscillator.

Syntax: [SENSe:]ROSCillator:EXTernal:FREQuency <numeric_value>
<numeric_value>::= 1MHz to 16MHz

Example: `"ROSC:EXT:FREQ 5MHz"`

Features: *RST value: 10MHz
SCPI: conforming

The value of the external reference frequency (1MHz to 16MHz) is rounded in steps of 1MHz.

[SENSe:]ROSCillator[:INTernal]:TUNe

This command defines the value for the tuning of the internal reference oscillator.

Syntax: [SENSe:]ROSCillator[:INTernal]:TUNe <numeric_value>
<numeric_value>::= 0 to 4095

Example: `"ROSC:TUN 128"`

Features: *RST value: –
SCPI: device-specific

The reference oscillator should be tuned only if an error has been detected in the frequency accuracy check. After PRESET or switching on the FSE, the saved value of the reference frequency is restored.

[SENSe:]ROSCillator[:INTernal]:TUNe:SAVe

This command saves the new value for the tuning of the internal reference oscillator. The factory-set value in the EEPROM is overwritten.

Syntax: [SENSe:]ROSCillator[:INTernal]:TUNe:SAVe

Example: `"ROSC:TUN:SAV"`

Features: *RST value: –
SCPI: device-specific

3.6.18.12 SENSe:SWEep Subsystem

This subsystem controls the sweep parameters.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:SWEep			
:TIME	<numeric_value>	S	
:AUTO	<Boolean>	--	
:COUNt	<numeric_value>	--	
:EGATe	<Boolean>	--	
:LEVel	<numeric_value>	V	
:TYPE	LEVel | EDGE	--	
:POLarity	POSitive|NEGative	--	
:HOLDoff	<numeric_value>	S	
:LENGth	<numeric_value>	S	
:SOURce	EXTernal | RFPower	--	
:GAP	<Boolean>	--	
:PRETrigger	<numeric_value>	S	
:TRGTogap	<numeric_value>	S	
:LENGth	<numeric_value>	S	

[SENSe:]SWEep:TIME

This command defines the duration of the sweep.

Syntax: [SENSe:]SWEep:TIME <numeric_value>
<numeric_value>::= 5 ms to 1000 s

Example: `"SWE:TIME 10s"`

Features: *RST value - (AUTO is set to ON)
SCPI: conforming

If `SWEep:TIME` is directly programmed, automatic coupling is switched off.

[SENSe:]SWEep:TIME:AUTO

This command switches the automatic coupling of the sweep time for the frequency span or bandwidth settings.

Syntax: [SENSe:]SWEep:TIME:AUTO ON | OFF

Example: `"SWE:TIME:AUTO ON"`

Features: *RST value: ON
SCPI: conforming

If `SWEep:TIME` is directly programmed, automatic coupling is switched off.

[SENSe:]SWEep:COUNt

This command defines the number of sweeps started with single sweep.

Syntax: [SENSe:]SWEep:COUNt <numeric_value>
<numeric_value>::= 0 to 32767

Example: "SWE:COUNT 64"

Features: *RST value: 0
SCPI: conforming

This parameter defines the number of sweeps or the number of averaging procedures. In the average mode, the value 0 defines a running averaging of measurement data over 10 sweeps.

[SENSe:]SWEep:EGATe

This command controls the sweep with the external gate signal.

Syntax: [SENSe:]SWEep:EGATe ON | OFF

Example: "SWE:EGAT ON"

Features: *RST value: OFF
SCPI: device-specific

[SENSe:]SWEep:EGATe:LEVel

This command determines the threshold for the external gate signal.

Syntax: [SENSe:]SWEep:EGATe:LEVel <numeric_value>
<numeric_value>::= -5V to +5V

Example: "SWE:EGAT:LEV 3V"

Features: *RST value: 2V
SCPI: device-specific

If SWEep:TIME is directly programmed, automatic coupling is switched off.

[SENSe:]SWEep:EGATe:TYPE

This command sets the type of triggering (level or edge) by the external gate signal.

Syntax: [SENSe:]SWEep:EGATe:TYPE LEVel | EDGE

Example: "SWE:EGAT:TYPE EDGE"

Features: *RST value: EDGE
SCPI: device-specific

Parameter EGATe:LENGth is not used for level triggering.

[SENSe:]SWEep:EGATe:POLarity

This command determines the polarity of the external gate signal.

Syntax: [SENSe:]SWEep:EGATe:POLarity POSitive | NEGative

Example: `"SWE:EGAT:POL POS"`

Features: *RST value: POSitive
SCPI: device-specific

[SENSe:]SWEep:EGATe:HOLDoff

This command defines the delay time between the external gate signal and the continuation of the sweep.

Syntax: [SENSe:]SWEep:EGATe:HOLDoff <numeric_value>
<numeric_value>::= 0 to 100s

Example: `"SWE:EGAT:HOLD 100us"`

Features: *RST value: 0s
SCPI: device-specific

The values for the delay time can be set in steps 1, 2, 3 and 5.

[SENSe:]SWEep:EGATe:LENGth

In case of edge triggering, this command determines the time interval in which the analyzer sweeps.

Syntax: [SENSe:]SWEep:EGATe:LENGth <numeric_value>
<numeric_value>::= 0 to 100s

Example: `"SWE:EGAT:LENG 10ms"`

Features: *RST value: 0s
SCPI: device-specific

The values for the delay time can be set in steps 1, 2, 3 and 5.

[SENSe:]SWEep:EGATe:SOURce

This command toggles between external gate signal and RF power signal.

Syntax: [SENSe:]SWEep:EGATe:SOURce EXTernal | RFPower

Example: `"SWE:EGAT:SOUR RFP"`

Features: *RST value: EXTernal
SCPI: device-specific

[SENSe:]SWEep:GAP

This command controls the operating mode GAP SWEEP.

Syntax: [SENSe:]SWEep:GAP ON | OFF

Example: "SWE:GAP ON"

Features: *RST value: OFF
SCPI: device-specific

Operating mode GAP SWEEP for measurements in the time domain controls the display of measured values. Measured values can be blanked for a defined time range (GAP).

[SENSe:]SWEep:GAP:PRETrigger

This command defines the evaluation time for measured values before the pretrigger time.

Syntax: [SENSe:]SWEep:GAP:PRETrigger <numeric_value>
<numeric_value>::= 0 to 100s (resolution: 50 ns)

Example: "SWE:GAP:PRET 100us"

Features: *RST value: 0s
SCPI: device-specific

[SENSe:]SWEep:GAP:TRGTogap

This command defines the time between the pretrigger time and the beginning of the gap (trigger-to-gap time)

Syntax: [SENSe:]SWEep:GAP:TRGTogap <numeric_value>
<numeric_value>::= 0 to 100s (resolution: 50 ns)

Example: "SWE:GAP:TRGT 50us"

Features: *RST value: 0s
SCPI: device-specific

[SENSe:]SWEep:GAP:LENGth

This command defines the gap length.

Syntax: [SENSe:]SWEep:GAP:LENGth <numeric_value>
<numeric_value>::= 0 to 100s

Example: "SWE:GAP:LENG 400us"

Features: *RST value: 0s
SCPI: device-specific

The gap length can be programmed from 0 to 100s in steps of 1, 2, 3 and 5.

3.6.18.13 SENSe:TV Subsystem

This subsystem controls the optional TV-demodulator (only in conjunction with option TV-Demodulator, FSE-B3).

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe]			
:TV			Option TV-Demodulator
[:STATe]	<Boolean>	--	
:PSOFfset	<numeric_value>	HZ	

[SENSe:]TV[:STATe]

This command switches the optional TV-demodulator on or off.

Syntax: [SENSe:]TV[:STATe] ON | OFF

Example: `"TV ON"`

Features: *RST value: OFF
SCPI: device-specific

This command is available only in conjunction with option TV-Demodulator, FSE-B3.

[SENSe:]TV:PSOFfset

This command defines the frequency offset between video and audio carrier of the measured signal.

Syntax: [SENSe:]TV:PSOFfset <numeric_value>
<numeric_value>::= 0 to 6.5 MHz

Example: `"TV:PSOF 1 MHz"`

Features: *RST value: 5 MHz
SCPI: device-specific

This command is available only in conjunction with option TV-Demodulator, FSE-B3.

3.6.19 SOURce Subsystem

The SOURce subsystem controls the output signals of the analyzer when the option Tracking Generator is installed (FSE-B8 to FSE-B11). In the split screen mode, a distinction is made between SOURce1 (screen A) and SOURce2 (screen B).

COMMAND	PARAMETERS	UNIT	COMMENT
SOURce<1|2>			Option Mitlaufgenerator
:AM			
:STATe	<Boolean>		
:DM			
:STATe	<Boolean>		
:FM			
:STATe	<Boolean>		
:FREQuency			
:OFFSet	<numeric_value>	HZ	
:POWer			
:ALC			
:SOURce	INTernal | EXTernal		
[:LEVel]			
[:IMMediate]			
[:AMPLitude]	<numeric_value>	DBM	
:OFFSet	<numeric_value>	DB	

SOURce<1|2>:AM:STATe

This command switches on or off the external amplitude modulation of the tracking generator.

Syntax: SOURce:AM:STATe ON | OFF

Example: "SOUR:AM:STAT ON "

Features: *RST-value: OFF
SCPI: conforming

External ALC and external I/Q-modulation is switched off, if active.

This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B11

SOURce<1|2>:DM:STATe

This command switches on or off the external delta modulation of the tracking generator.

Syntax: SOURce:DM:STATe ON | OFF

Example: "SOUR:DM:STAT ON "

Features: *RST- value: OFF
SCPI: conforming

External AM, external ALC, external FM and external frequency offset are switched off, if active.

This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B11

SOURce<1|2>:FM:STATe

This command switches on or off the external frequency modulation of the tracking generator.

Syntax: SOURce:FM:STATe ON | OFF

Example: `"SOUR:FM:STAT ON "`

Features: *RST-value: OFF
SCPI: conforming

External AM, external I/Q-modulation and frequency offset are switched off, if active. This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B11

SOURce<1|2>:FREQuency:OFFSet

This command defines a frequency offset of the tracking generators to the current analyzer frequency.

Syntax: SOURce:FREQuency:OFFSet <numeric value>
<numeric value>::= -200MHz to 200MHz

Example: `"SOUR:FREQ:OFFS "`

Features: *RST-value: 0 Hz
SCPI: conforming

External delta modulation is switched off, if active. This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B11

SOURce<1|2>:POWer:ALC:SOURce

This command switches on or off the external level control (ALC).

Syntax: SOURce:POWer:ALC:SOURce INTernal | EXTernal

Example: `"SOUR:POW:ALC:SOUR INT "`

Features: *RST- value: INT
SCPI: conforming

External AM and external delta modulation are switched off, if active. This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B11

SOURce<1|2>:POWer[:LEVel][:IMMediate][:AMPLitude]

This command defines the level of the tracking generator.

Syntax: SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <numeric value>
<numeric value>::= -20dBm to 0dBm / Option FSE-B12: -90dBm to 0dBm

Example: `"SOUR:POW -20dBm"`

Features: *RST- value:
SCPI: conforming

This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B11

SOURce<1|2>:POWer[:LEVel][:IMMediate]:OFFSet

This command defines a level offset for the tracking generator.

Syntax: SOURce:POWer[:LEVel][:IMMediate]:OFFSet <numeric value>
<numeric value>::= -200dB to +200dB

Example: "SOUR:POW:OFFS -10dB"

Features: *RST- value: 0dB
SCPI: conforming

This command is only valid in conjunction with option Tracking Generator, FSE-B8 to B11

3.6.20 STATus Subsystem

The STATus subsystem contains the commands for the status reporting system (see Section 3.8, Status Reporting System"). *RST does not influence the status registers.

COMMAND	PARAMETERS	UNIT	COMMENT
STATus			
:OPERation			
[:EVENt?]	--	--	
:CONDition?	--	--	
:ENABle	0 to 65535	--	
:PTRansition	0 to 65535	--	
:NTRansition	0 to 65535	--	
:PRESet	--	--	
:QUEStionable			
[:EVENt?]	--	--	
:CONDition?	--	--	
:ENABle	0 to 65535	--	
:PTRansition	0 to 65535	--	
:NTRansition	0 to 65535	--	
:POWer			
[:EVENt?]	--	--	
:CONDition?	--	--	
:ENABle	0 to 65535	--	
:PTRansition	0 to 65535	--	
:NTRansition	0 to 65535	--	
:LIMit			
[:EVENt?]	--	--	
:CONDition?	--	--	
:ENABle	0 to 65535	--	
:PTRansition	0 to 65535	--	
:NTRansition	0 to 65535	--	
:LMARgin			
[:EVENt?]	--	--	
:CONDition?	--	--	
:ENABle	0 to 65535	--	
:PTRansition	0 to 65535	--	
:NTRansition	0 to 65535	--	
:SYNC			
[:EVENt?]	--	--	
:CONDition?	--	--	
:ENABle	0 to 65535	--	
:PTRansition	0 to 65535	--	
:NTRansition	0 to 65535	--	
:ACPLimit			
[:EVENt?]	--	--	
:CONDition?	--	--	
:ENABle	0 to 65535	--	
:PTRansition	0 to 65535	--	
:NTRansition	0 to 65535	--	

COMMAND	PARAMETERS	UNIT	COMMENT
STATus			
:QUEStionable	--	--	
:FREQuency	--	--	
[:EVENt?]	0 to 65535	--	
:CONDition?	0 to 65535	--	
:ENABle	0 to 65535	--	
:PTRansition	--	--	
:NTRansition	--	--	
:QUEue?			
[:NEXT?]			

STATus:OPERation[:EVENt?]

This command queries the contents of the EVENt section of the STATus:OPERation register.

Syntax: STATus:OPERation[:EVENt?]

Example: `"STAT:OPER?"`

Features: *RST value: –
SCPI: conforming

The contents of the EVENt section is deleted with readout.

STATus:OPERation:CONDition?

This command queries the CONDition section of the STATus:OPERation register.

Syntax: STATus:OPERation:CONDition?

Example: `"STAT:OPER:COND?"`

Features: *RST value: –
SCPI: conforming

Readout does not delete the contents of the CONDition section. The value returned reflects the current hardware status.

STATus:OPERation:ENABle

This command sets the bits of the ENABle section of the STATus:QUEStionable register.

Syntax: STATus:OPERation:ENABle 0 to 65535

Example: `"STAT:OPER:ENAB 65535"`

Features: *RST value: –
SCPI: conforming

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:OPERation:PTRansition

This command sets the edge detectors of all bits of the STATus:OPERation register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:OPERation:PTRansition 0 to 65535

Example: `"STAT:OPER:PTR 65535"`

Features: *RST value: –
SCPI: conforming

STATus:OPERation:NTRansition

This command sets the edge detectors of all bits of the STATus:OPERation register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:OPERation:NTRansition 0 to 65535

Example: `"STAT:OPER:NTR 65535"`

Features: *RST value: –
SCPI: conforming

STATus:PRESet

This command resets the edge detectors and ENABle parts of all registers to a defined value. All PTRansition parts are set to FFFFh, i.e., all transitions from 0 to 1 are detected. All NTRansition parts are set to 0, i.e., a transition from 1 to 0 in a CONDition bit is not detected. The ENABle part of the STATus:OPERation and STATus:QUEStionable registers are set to 0, i.e., all events in these registers are not passed on.

Syntax: STATus:PRESet

Example: `"STAT:PRES"`

Features: *RST value: –
SCPI: conforming

STATus:QUEStionable[:EVENt?]

This command queries the contents of the EVENt section of the STATus:QUEStionable register.

Syntax: STATus:QUEStionable[:EVENt?]

Example: `"STAT:QUES?"`

Features: *RST value: –
SCPI: conforming

Readout deletes the contents of the EVENt section.

STATus:QUEStionable:CONDition?

This command queries the CONDition section of the STATus:QUEStionable register.

Syntax: STATus:QUEStionable:CONDition?

Example: `"STAT:QUES:COND?"`

Features: *RST value: –
SCPI: conforming

Readout does not delete the contents of the CONDition section.

STATus:QUEStionable:ENABle

This command sets the bits of the ENABle section of the STATus-QUEStionable register.

Syntax: STATus:QUEStionable:ENABle 0 to 65535

Example: `"STAT:QUES:ENAB 65535"`

Features: *RST value: –
SCPI: conforming

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:QUEStionable:PTRansition

This command sets the edge detectors of all bits of the STATus:OPERation register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:PTRansition 0 to 65535

Example: `"STAT:QUES:PTR 65535"`

Features: *RST value: –
SCPI: conforming

STATus:QUEStionable:NTRansition

This command sets the edge detectors of all bits of the STATus:OPERation register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:NTRansition 0 to 65535

Example: `"STAT:QUES:NTR 65535"`

Features: *RST value: –
SCPI: conforming

STATus:QUEStionable:POWer[:EVENt]?

This command queries the contents of the EVENt section of the STATus:QUEStionable:POWer register.

Syntax: STATus:QUEStionable:POWer[:EVENt?]

Example: "STAT:QUES?"

Features: *RST value: –
SCPI: conforming

Readout deletes the contents of the EVENt section.

STATus:QUEStionable:POWer:CONDition?

This command queries the content of the CONDition section of the STATus:QUEStionable:POWer register.

Syntax: STATus:QUEStionable:POWer:CONDition?

Example: "STAT:QUES:COND?"

Features: *RST value: –
SCPI: conforming

Readout does not delete the contents of the CONDition section.

STATus:QUEStionable:POWer:ENABle

This command sets the bits of the ENABle section of the STATus:QUEStionable:POWer register.

Syntax: STATus:QUEStionable:POWer:ENABle 0 to 65535

Example: "STAT:QUES:ENAB 65535"

Features: *RST value: –
SCPI: conforming

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:QUEStionable:POWer:PTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable:POWer register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:POWer:PTRansition 0 to 65535

Example: "STAT:QUES:PTR 65535"

Features: *RST-value: –
SCPI: conforming

STATus:QUEStionable:POWer:NTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable:POWer register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:POWer:NTRansition 0 to 65535

Example: `"STAT:QUES:NTR 65535"`

Features: *RST value: –
SCPI: conforming

STATus:QUEStionable:LIMit[:EVENt]?

This command queries the contents of the EVENt section of the STATus:QUEStionable:LIMit register.

Syntax: STATus:QUEStionable:LIMit[:EVENt?]

Example: `"STAT:QUES?"`

Features: *RST value: –
SCPI: device-specific

Readout deletes the contents of the EVENt section.

STATus:QUEStionable:LIMit:CONDition?

This command queries the contents of the CONDition section of the STATus:QUEStionable:LIMit register.

Syntax: STATus:QUEStionable:LIMit:CONDition?

Example: `"STAT:QUES:COND?"`

Features: *RST value: –
SCPI: device-specific

Readout does not delete the contents of the CONDition section.

STATus:QUEStionable:LIMit:ENABle

This command sets the bits of the ENABle section of the STATus:QUEStionable register.

Syntax: STATus:QUEStionable:LIMit:ENABle 0 to 65535

Example: `"STAT:QUES:ENAB 65535"`

Features: *RST value: –
SCPI: device-specific

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:QUEStionable:LIMit:PTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable:LIMit register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:LIMit:PTRansition 0 to 65535

Example: `"STAT:QUES:PTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:LIMit:NTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable:LIMit register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:LIMit:NTRansition 0 to 65535

Example: `"STAT:QUES:NTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:LMARgin[:EVENt]?

This command queries the contents of the EVENt section of the STATus:QUEStionable:LMARgin register.

Syntax: STATus:QUEStionable:LMARgin[:EVENt?]

Example: `"STAT:QUES?"`

Features: *RST value: –
SCPI: device-specific

Readout deletes the contents of the EVENt section.

STATus:QUEStionable:LMARgin:CONDition?

This command queries the contents of the CONDition section of the STATus:QUEStionable:LMARgin register.

Syntax: STATus:QUEStionable:LMARgin:CONDition?

Example: `"STAT:QUES:COND?"`

Features: *RST value: –
SCPI: device-specific

Readout does not delete the contents of the CONDition section.

STATus:QUEStionable:LMARgin:ENABle

This command sets the bits of the ENABle section of the STATus:QUEStionable:LMARgin register.

Syntax: STATus:QUEStionable:LMARgin:ENABle 0 to 65535

Example: `"STAT:QUES:ENAB 65535"`

Features: *RST value: –
SCPI: device-specific

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:QUEStionable:LMARgin:PTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable: LMARgin register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:LMARgin:PTRansition 0 to 65535

Example: `"STAT:QUES:PTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:LMARgin:NTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable: LMARgin register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:LMARgin:NTRansition 0 to 65535

Example: `"STAT:QUES:NTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:SYNC[:EVENt]?

This command queries the contents of the EVENt section of the STATus:QUEStionable:SYNC register.

Syntax: STATus:QUEStionable:SYNC[:EVENt?]

Example: `"STAT:QUES?"`

Features: *RST value: –
SCPI: device-specific

Readout deletes the contents of the EVENt section.

STATus:QUEStionable:SYNC:CONDition?

This command queries the contents of the CONDition section of the STATus:QUEStionable:SYNC register.

Syntax: STATus:QUEStionable:SYNC:CONDition?

Example: `"STAT:QUES:COND?"`

Features: *RST value: –
SCPI: device-specific

Readout does not delete the contents of the CONDition section.

STATus:QUEStionable:SYNC:ENABle

This command sets the bits of the ENABle section of the STATus:QUEStionable: SYNC register.

Syntax: STATus:QUEStionable:SYNC:ENABle 0 to 65535

Example: `"STAT:QUES:ENAB 65535"`

Features: *RST value: –
SCPI: device-specific

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:QUEStionable:SYNC:PTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable: SYNC register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:SYNC:PTRansition 0 to 65535

Example: `"STAT:QUES:PTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:SYNC:NTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable: SYNC register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:SYNC:NTRansition 0 to 65535

Example: `"STAT:QUES:NTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:ACPLimit[:EVENt]?

This command queries the contents of the EVENt section of the STATus:QUEStionable:ACPLimit register.

Syntax: STATus:QUEStionable:ACPLimit[:EVENt?]

Example: `"STAT:QUES:ACPL?"`

Features: *RST value: –
SCPI: device-specific

Readout deletes the contents of the EVENt section.

STATus:QUEStionable:ACPLimit:CONDition?

This command queries the contents of the CONDition section of the STATus:QUEStionable:ACPLimit register.

Syntax: STATus:QUEStionable:ACPLimit:CONDition?

Example: `"STAT:QUES:ACPL:COND?"`

Features: *RST value: –
SCPI: device-specific

Readout does not delete the contents of the CONDition section.

STATus:QUEStionable:ACPLimit:ENABle

This command sets the bits of the ENABle section of the STATus:QUEStionable:ACPLimit register.

Syntax: STATus:QUEStionable:ACPLimit:ENABle 0 to 65535

Example: `"STAT:QUES:ACPL:ENAB 65535"`

Features: *RST value: –
SCPI: device-specific

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:QUEStionable:ACPLimit:PTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable: ACPLimit register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:ACPLimit:PTRansition 0 to 65535

Example: `"STAT:QUES:ACPL:PTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:ACPLimit:NTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable: ACPLimit register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:ACPLimit:NTRansition 0 to 65535

Example: `"STAT:QUES:ACPL:NTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:FREQuency[:EVENt]?

This command queries the contents of the EVENt section of the STATus:QUEStionableFREQuency register.

Syntax: STATus:QUEStionable:FREQuency[:EVENt?]

Example: `"STAT:QUES:FREQ?"`

Features: *RST value: –
SCPI: device-specific

Readout deletes the contents of the EVENt section.

STATus:QUEStionable:FREQuency:CONDition?

This command queries the contents of the CONDition section of the STATus:QUEStionable:FREQuency register.

Syntax: STATus:QUEStionable:FREQuency:CONDition?

Example: `"STAT:QUES:FREQ:COND?"`

Features: *RST value: –
SCPI: device-specific

Readout does not delete the contents of the CONDition section.

STATus:QUEStionable:FREQuency:ENABle

This command sets the bits of the ENABle section of the STATus:QUEStionable:FREQuency register.

Syntax: STATus:QUEStionable:FREQuency:ENABle 0 to 65535

Example: `"STAT:QUES:FREQ:ENAB 65535"`

Features: *RST value: –
SCPI: device-specific

The ENABle register selectively enables the individual events of the associated EVENt section for the sum bit in the status byte.

STATus:QUEStionable:FREQuency:PTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable:FREQuency register from 0 to 1 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:FREQuency:PTRansition 0 to 65535

Example: `"STAT:QUES:FREQ:PTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEStionable:FREQuency:NTRansition

This command sets the edge detectors of all bits of the STATus:QUEStionable:FREQuency register from 1 to 0 for the transitions of the CONDition bit.

Syntax: STATus:QUEStionable:FREQuency:NTRansition 0 to 65535

Example: `"STAT:QUES:FREQ:NTR 65535"`

Features: *RST value: –
SCPI: device-specific

STATus:QUEue[:NEXT?]

This command queries the earliest entry to the error queue, thus deleting it.

Syntax: STATus:QUEue[:NEXT?]

Example: `"STAT:QUE?"`

Features: *RST value: –
SCPI: conforming

Positive error numbers indicate device-specific errors, negative error numbers are error messages defined by SCPI (cf. Appendix B). If the error queue is empty, the error number 0, "no error", is returned. This command is identical with the command `SYSTem:ERRor`.

3.6.21 SYSTem Subsystem

This subsystem comprises a series of commands for general functions.

COMMAND	PARAMETERS	UNIT	COMMENT
SYSTem			
:COMMunicate			
:GPIB			
[:SELF]			
:ADDRess	0 to 30	--	
:RTERminator	LFEoi | EOI		
:RDEVice<1|2>			
:ADDRess	0 to 30	--	
:SERial<1|2>			
:CONTrol			
:DTR	IBFull | OFF		
:RTS	IBFull | OFF		
[:RECeive]		--	
:BAUD	<numeric_value>	--	
:BITS	7 | 8		
:PARity			
[:TYPE]	EVEN | ODD | NONE	--	
:SBITs	1 | 2		
:PACE	XON | NONE	--	
:DATE	<num>, <num>, <num>	--	
:DISPlay			
:UPDate	ON | OFF		
:ERRor?	--		query only
:PASSword		--	
[:CENable]	<string>		no query
:PRESet	--		no query
:SET	<block>	--	
:SPEaker		--	
:VOLume	<numeric_value>	--	
:TIME	0 to 23, 0 to 59, 0 to 59		
:VERSion?	--		query only

SYSTem:COMMunicate:GPIB[:SELF]:ADDRess

This command changes the IEC/IEEE-bus address of the unit.

Syntax: SYSTem:COMMunicate:GPIB[:SELF]:ADDRess 0 to 30

Example: `"SYST:COMM:GPIB:ADDR 18"`

Features: *RST value: - (no influence on this parameter)
SCPI: conforming

SYSTem:COMMunicate:GPIB[:SELF]:RTERminator

This command changes the delimiter.

Syntax: SYSTem:COMMunicate:GPIB[:SELF]:RTERminator LFEOI | EOI

Example: `"SYST:COMM:GPIB:RTERM EOI"`

Features: *RST value: LFEOI
SCPI: device-specific

The analyzer contains a DMA-channel for communication via IEC-bus. This ensures maximum speed for the transfer of commands and data. The parser for command decoding integrated in the instrument is, however, only activated by the delimiter when the command is completely transferred. In order to make this possible for the transfer of binary data, too (e. g. trace data which are retransferred into the instrument), the delimiter recognition must be switched to the EOI signal prior to the transfer. Output of binary data from the instrument does not require such a switching.

SYSTem:COMMunicate:GPIB:RDEVice<1|2>:ADDRess

This command changes the IEC/IEEE-bus address of the unit which is selected as hardcopy device 1 or 2, provided that the IEC/IEEE-bus interface of this unit is set as an interface.

Syntax: SYSTem:COMMunicate:GPIB:RDEVice<1|2>:ADDRess 0 to 30

Example: `"SYST:COMM:GPIB:RDEV2:ADDR 5"`

Features: *RST value: 4
SCPI: conforming

SYSTem:COMMunicate:SERial<1|2>:CONTrol:DTR
SYSTem:COMMunicate:SERial<1|2>:CONTrol:RTS

These commands switch the hardware handshake procedure for the given serial interface off (OFF) or on (IBFull).

Syntax: SYSTem:COMMunicate:SERial<1|2>:CONTrol:DTR IBFull | OFF
SYSTem:COMMunicate:SERial<1|2>:CONTrol:RTS IBFull | OFF

Examples:
```
"SYST:COMM:SER:CONT:DTR OFF"
"SYST:COMM:SER2:CONT:RTS IBF"
```

Features: *RST value: OFF
SCPI: conforming

The two commands have the same meaning. SERial1 and SERial 2 correspond to device COM1and COM2, respectively.

SYSTem:COMMunicate:SERial<1|2>[:RECeive]:BAUD

This command sets the transmission speed for the given serial interface.

Syntax: SYSTem:COMMunicate:SERial<1|2>[:RECeive:]BAUD <numeric_value>
<numeric_value>::= 75 | 150 | 300 | 600 | 1200 | 2400 | 9600

Example: `"SYST:COMM:SER:BAUD 2400"`

Features: *RST value: 9600
SCPI: conforming

SERial1 and SERial 2 correspond to device interface COM1 and COM2, respectively. Permissible values are 75 Baud, 150 Baud, 300 Baud, 600 Baud, 1200 Baud, 2400 Baud, 4800 Baud, 9600 Baud.

SYSTem:COMMunicate:SERial<1|2>[:RECeive]:BITS

This command defines the number of data bits per data word for the given serial interface.

Syntax: SYSTem:COMMunicate:SERial<1|2>[:RECeive]:BITS 7 | 8

Example: `"SYST:COMM:SER2:BITS 7"`

Features: *RST value: 8
SCPI: conforming

SERial1 and SERial 2 correspond to device interface COM1 and COM2, respectively.

SYSTem:COMMunicate:SERial<1|2>[:RECeive]:PARity[:TYPE]

This command defines the parity check for the given serial interface.

Syntax: SYSTem:COMMunicate:SERial<1|2>:RECeive:PARity[:TYPE]
EVEN | ODD | NONE

Example: `"SYST:COMM:SER:PAR EVEN"`

Features: *RST value: NONE
SCPI: conforming

SERial1 and SERial 2 correspond to device interface COM1 and COM2, respectively. Permissible values are:

EVEN	even parity
ODD	odd parity
NONE	no parity check.

SYSTem:COMMunicate:SERial<1|2>[:RECeive]:SBITs

This command defines the number of stopbits per data word for the given serial interface.

Syntax: SYSTem:COMMunicate:SERial<1|2>[:RECeive]:SBITs 1|2

Example: `"SYST:COMM:SER:SBITs 2"`

Features: *RST value: 1
SCPI: conforming

SERial1 and SERial 2 correspond to device interface COM1 and COM2, respectively.

SYSTem:COMMunicate:SERial<1|2>[:RECeive]:PACE

This command switches on or off the software handshake for the given serial interface.

Syntax: SYSTem:COMMunicate:SERial<1|2>[:RECeive]:PACE XON | NONE

Example: `"SYST:COMM:SER:PACE XON"`

features: *RST value: NONE
SCPI: conforming

SERial1 and SERial 2 correspond to device interface COM1 and COM2, respectively.

SYSTem:DATE

This command is used to enter the date for the internal calendar.

Syntax: SYSTem:DATE <num>,<num>,<num>
<num>,<num>,<num> ::= 1980 to 2099, 1 to 12, 1 to 31

Example: `" SYST:DATE 1994,12,1"`

Features: *RST value: –
SCPI: conforming

The sequence of entry is year, month, day.

SYSTem:DISPlay:UPDate

This command switches on or off the update of all display elements.

Syntax: SYSTem:DISPlay:UPDate ON | OFF

Example: `" SYST:DISP ON`

Features: *RST value: OFF
SCPI: device specific

SYSTem:ERRor?

This command queries the earliest entry to the error queue, thus deleting it.

Syntax: SYSTem:ERRor?

Example: `"SYST:ERR?"`

Features: *RST value: –
SCPI: conforming

Positive error numbers indicate device-specific errors, negative error numbers are error messages defined by SCPI (cf. Appendix B). If the error queue is empty, the error number 0, "no error", is returned. This command is identical with the command `STATus:QUEue:NEXT?`. This command is a query which is why it is not assigned an *RST value.

SYSTem:PASSword[:CENable]

This command enables access to the service functions by means of the password.

Syntax: SYSTem:PASSword[:CENable] <string>

Example: `"SYST:PASS 'XXXX'"`

Features: *RST value: –
SCPI: conforming

This command is an event which is why it is not assigned an *RST value and has no query.

SYSTem:SET

This command recalls the instrument setting saved by command SYST:SET?.

Syntax: SYSTem:SET

Example: `"SYST:SET"`

Features: *RST value: –
SCPI: conforming

The receive terminator has to be set to EOI to ensure reliable transfer of data (setting SYST:COMM:GPIB:RTER EOI).

SYSTem:PRESet

This command triggers an instrument reset.

Syntax: SYSTem:PRESet

Example: `"SYST:PRES"`

Features: *RST value: –
SCPI: conforming

The effect of this command corresponds to that of the *PRESET* key with manual control or to the *RST command.

SYSTem:SPEaker:VOLume

This command sets the volume of the built-in loudspeaker for demodulated signals.

Syntax: SYSTem:SPEaker:VOLume <numeric_value>
<numeric_value> ::= 0 to 1

Example: "SYST:SPE:VOL 0.5"

Features: *RST value: 0
SCPI: device-specific

The value 0 is the lowest volume, the value 1 is the highest volume.

SYSTem:TIME

This command sets the internal clock.

Syntax: SYSTem:TIME 0 to 23, 0 to 59, 0 to 59

Example: "SYST:TIME 12,30,30"

Features: *RST value: –
SCPI: conforming

The sequence of entry is hour, minute, second.

SYSTem:VERSion?

This command queries the number of the SCPI version, which is relevant for the instrument.

Syntax: SYSTem:VERSion?

Example: "SYST:VERS?"

Features: *RST value: –
SCPI: conforming

This command is a query which is why it is not assigned an *RST value.

3.6.22 TRACe Subsystem

The TRACe subsystem controls access to the instrument's internal trace memory.

COMMAND	PARAMETERS	UNIT	COMMENT
TRACe			
[:DATA]	TRACE1 | TRACE2 | TRACE3 | TRACE4, <block>|<numeric_value>...	-	
:COPY	TRACE1|TRACE2|TRACE3|TRACE4, TRACE1|TRACE2|TRACE3|TRACE4		

TRACe[:DATA]

This command transfers trace data from the controller to the instrument, the query reads trace data out of the instrument.

Syntax: TRACe[:DATA] TRACE1 | TRACE2 | TRACE3 | TRACE4, <block>|<numeric_value>
TRACe[:DATA]? TRACE1 | TRACE2 | TRACE3 | TRACE4'

Example:
```
"TRAC TRACE1,"+A$    (A$: data list in the current format)
"TRAC? TRACE1"
```

Features: *RST value: -
SCPI: conforming

The trace data are transferred in the current format (corresponding to the command FORMat ASCii|REAL). The device-internal trace memory is addressed using the trace names 'TRACE1' to 'TRACE4'.
The parameter of the query is the trace name TRACE1 to TRACE4, it indicates which trace memory will be read out.
The transfer of trace data from the controller to the instrument takes place by indicating the trace name and then the data to be transferred. In ASCII format, these data are values separated by commas. If the transfer takes place using the format real (REAL 32), the data are transferred in block format.

Saving and recalling trace data to/from the device-internal hard disk or to/from a floppy is controlled via the commands "`MMEMory:STORe:TRACe`" and "`MMEMory:LOAD:TRACe`" respectively.

TRACe:COPY

This command copies data from one trace to another. The second operand designates the source, the first operand the destination of the data to be copied.

Syntax: TRACe:COPY TRACE1| TRACE2| TRACE3| TRACE4 ,
TRACE1| TRACE2| TRACE3| TRACE4

Example:
```
"TRAC:COPY TRACE1,TRACE2"
```

Features: *RST value:
SCPI: conforming

This command is an event and therefore has no query and no *RST value assigned.

3.6.23 TRIGger Subsystem

The TRIGger subsystem is used to synchronize instrument actions with events. This makes it possible to control and synchronize the start of a sweep. An external trigger signal can be fed to the connector at the rear panel of the instrument. In split screen mode, a distinction is made between TRIGger1 (screen A) and TRIGger2 (screen B).

COMMAND	PARAMETERS	UNIT	COMMENT
TRIGger<1|2>			
[:SEQuence]			
:SOURce	IMMediate | LINE | EXTerna | |VIDeo | RFPower | TV | AF	--	TV only with option TV Demodulator
:LEVel			
[:EXTernal]	<numeric_value>	V|MV|UV	
:VIDeo	<numeric_value>	PCT	
:HOLDoff	<numeric_value>	S	
:SLOPe	POSitive|NEGative	--	
:VIDeo	525 | 625		
:FORMat			
:LPFRame			Option TV Demodulator
:FIELd			
:SELect	ALL | ODD | EVEN		Option TV Demodulator
:LINE			
:NUMBer	<numeric_value>		Option TV Demodulator
:SSIGnal			
:POLarity	NEGative | POSitive		Option TV Demodulator
:SYNChronize			
:ADJust			
:FRAMe	<numeric_value>	s	Option FSE-K11or FSE-K10
:AUTO	ONCE		Option FSE-K11or FSE-K10 & FSE-B7
:SLOT	<numeric_value>	s	Option FSE-K11 or FSE-K10
:AUTO	ONCE		Option FSE-K11 or FSE-K10 & FSE-B7
:SOURCe	FRAMe | TSC		Option FSE-K11or FSE-K10 & FSE-B7

TRIGger<1\|2>[:SEQuence]:SOURce

This command selects the trigger source for the start of a sweep.

Syntax: TRIGger<1|2>[:SEQuence]:SOURce IMMediate | LINE | EXTernal | VIDeo | RFPower | TV | AF

Example: `"TRIG:SOUR EXT"`

Features: *RST value: IMMediate
SCPI: conforming

The value IMMediate corresponds to the "FREE RUN" setting.
Selecting the parameter TV is possible only when the option TV-demodulator is fitted, the parameter AF only in the vector signal analysis mode with analog demodulation.

TRIGger<1|2>[:SEQuence]:LEVel[:EXTernal]

This command sets the level of the external trigger source.

Syntax: TRIGger<1|2>[:SEQuence]:LEVel[:EXTernal] <numeric_value>
<numeric_value>::= –5.0 to +5.0V

Example: `"TRIG:LEV 2V"`

Features: *RST value: –5.0V
SCPI: conforming

TRIGger<1|2>[:SEQuence]:LEVel:VIDeo

This command sets the level of the video trigger source.

Syntax: TRIGger<1|2>[:SEQuence]:LEVel:VIDeo <numeric_value>
<numeric_value>::= 0 to 100PCT

Example: `"TRIG:LEV:VID 50PCT"`

Features: *RST value: 50 PCT
SCPI: device-specific

TRIGger<1|2>[:SEQuence]:HOLDoff

This command defines the length of the trigger delay.

Syntax: TRIGger<1|2>[:SEQuence]:HOLDoff <numeric_value>
<numeric_value>::= 0 to 100s

Example: `"TRIG:HOLD 500us"`

Features: *RST value: 0s
SCPI: conforming

TRIGger<1|2>[:SEQuence]:SLOPe

This command selects the slope of the trigger signal.

Syntax: TRIGger<1|2>[:SEQuence]:SLOPe POSitive | NEGative

Example: `"TRIG:SLOP NEG"`

Features: *RST value: POSitive
SCPI: conforming

The selected trigger slope applies to all trigger signal sources.

TRIGger<1|2>[:SEQuence]:VIDeo:FORMat:LPFRame

This command defines the number of lines per frame to be used (525 or 625 lines)

Syntax: TRIGger<1|2>[:SEQuence]:VIDeo:FORMat:LPFRame 525 | 625

Example: `"TRIG:VID:FORM:LPFR 525"`

Features: *RST value:
SCPI: conforming

This command is only valid if option FSE-B3, TV Demodulator, is fitted.

TRIGger<1|2>[:SEQuence]:VIDeo:LINE:NUMBer

This command selects the horizontal synchronizing signal for triggering.

Syntax: TRIGger<1|2>[:SEQuence]:VIDeo:LINE:NUMBer <numeric value>

Example: `"TRIG:VID:LINE:NUMB 17"`

Features: *RST value:
SCPI: conforming

The instrument is triggered at the specified line. This command is only valid if option FSE-B3, TV Demodulator is fitted.

TRIGger<1|2>[:SEQuence]:VIDeo:FIELd:SELect

This command selects the vertical synchronizing signal for triggering.

Syntax: TRIGger<1|2>[:SEQuence]:VIDeo:FIELd:SELect ALL | ODD | EVEN

Example: `"TRIG:VID:FIEL:SEL ALL"`

Features: *RST value:
SCPI: conforming

With the parameter ALL, the instrument is triggered when the field is changed, irrespective of the half fields. With ODD, triggering by the first half field, with even, triggering by the second half field is selected. This command is valid only if option FSE-B3, TV Demodulator, is fitted.

TRIGger<1|2>[:SEQuence]:VIDeo:SSIGnal:POLarity

This command defines the polarity of the video synchronizing signal.

Syntax: TRIGger<1|2>[:SEQuence]:VIDeo:SSIGnal:POLarity NEGative | POSitive

Example: `"TRIG:VID:SSIG:POL NEG "`

Features: *RST value:
SCPI: conforming

This command is valid only if option FSE-B3, TV Demodulator, is fitted.

TRIGger[:SEQuence]:SYNChronize:ADJust:FRAMe

This command defines the correction value for the time offset between the frame trigger and the midamble of the slot selected. The value set is corrected by means of the calculated offsets of the other slots and used as a base value for the correction of all slots.
This correction value is necessary in order to conserve the exact time relation between the trigger event and the midamble of the slot in question in cases where there is no midamble triggering.

Syntax: TRIGger[:SEQuence]:SYNChronize:ADJust:FRAMe <numeric_value>
<numeric_value>::= 0 to 100s

Example: `"TRIG:SYNC:ADJ:FRAM 30us"`

Features: *RST value: -- (depending on the slot selected)
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10.

TRIGger[:SEQuence]:SYNChronize:ADJust:FRAMe:AUTO

This command determines once the correction value for the time offset between the frame trigger and the midamble of the slot selected. The value set is corrected by means of the calculated offsets of the other slots and used as a base value for the correction of all slots.
This correction value is necessary in order to conserve the exact time relation between the trigger event and the midamble of the slot in question in cases where there is no midamble triggering.

Syntax: TRIGger[:SEQuence]:SYNChronize:ADJust:FRAMe:AUTO ONCE

Example: `"TRIG:SYNC:ADJ:FRAMe:AUTO ONCE"`

Features: *RST value: --
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and with option Vector Signal Analysis, FSE-B7.

TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT

This command defines the correction value for the time offset between the frame trigger and the midamble of the slot selected, without influencing the correction values of the other slots.
This correction value is necessary in order to conserve the exact time relation between the trigger event and the midamble of the slot in question in cases where there is no midamble triggering. The value set is corrected by means of the calculated offsets of the other slots and used as a base value for the correction of all slots.

Syntax: TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT <numeric_value>
<numeric_value>::= 0 to 100s

Example: `"TRIG:SYNC:ADJ:SLOT 30us"`

Features: *RST value: -- (depending on slot selected)
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11 or GSM MS Analyzer, FSE-K10.

TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT:AUTO

This command defines the correction value for the time offset between the frame trigger and the midamble of the slot selected. The value set is corrected by means of the calculated offsets of the other slots and used as a base value for the correction of all slots.
This correction value is necessary in order to conserve the exact time relation between the trigger event and the midamble of the slot in question in cases where there is no midamble triggering.

Syntax: TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT:AUTO ONCE

Example: `"TRIG:SYNC:ADJ:SLOT:AUTO ONCE"`

Features: *RST value: --
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10, and with option Vector Signal Analysis, FSE-B7.

TRIGger[:SEQuence]:SYNChronize:SOURce

This command defines the trigger reference point for measurements in the time domain (carrier power, power vs. time). The frame trigger of the base station or mobile may be selected as well as the relation to the midamble (TSC) of the slot to be measured.

Syntax: TRIGger[:SEQuence]:SYNChronize:SOURce FRAME | TSC

Example: `"TRIG:SYNC:SOURce TSC"`

Features: *RST value: FRAME
SCPI: device-specific

This command is available only in conjunction with option GSM BTS Analyzer, FSE-K11, or GSM MS Analyzer, FSE-K10. The parameter TSC requires in addition the option Vector Signal Analysis, FSE-B7.

3.6.24 UNIT Subsystem

The UNIT subsystem is used to switch the basic unit of setting parameters. In split screen mode, a distinction is made between UNIT1 (screen A) and UNIT2 (screen B).

COMMAND	PARAMETERS	UNIT	COMMENT
UNIT<1|2>			
:POWer	DBM | DBPW | WATT | DBUV | DBMV | VOLT | DBUA | AMPere V | W | DB | PCT | UNITLESS | DBUV_MHZ | DBMV_MHZ | DBUA_MHZ | DBUV_M | DBUA_M | DBUV_MMHZ | DBUA_MMHZ		
:PROBe	<Boolean>		

UNIT<1|2>:POWer

This command selects the default unit for input and output.

Syntax: UNIT<1|2>:POWer DBM | DBPW | WATT | DBUV | DBMV | VOLT | DBUA | AMPere | V | W | DB | PCT | UNITLESS | DBUV_MHZ | DBMV_MHZ | DBUA_MHZ | DBUV_M | DBUA_M | DBUV_MMHZ | DBUA_MMHZ

Example: `"UNIT:POW DBUV"`

Features: *RST value: DBM
SCPI: conforming

UNIT<1|2>:PROBe

This command determines whether the coding of a probe which is connected to the front panel is taken into consideration (ON) or not (OFF).

Syntax: UNIT<1|2>:PROBe ON | OFF

Example: `"UNIT:PROB OFF"`

Features: *RST value: ON
SCPI: device-specific

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3.9 Table of Softkeys with IEC/IEEE-Bus Command Assignment

3.9.1 Basic Instrument - Signal Analysis Mode

3.9.1.1 FREQUENCY Key Group

START	
START MANUAL	[SENSe:]FREQuency:STARt <numeric_value>
STOP FIXED	[SENSe:]FREQuency:STARt:LINK STOP
SPAN FIXED	[SENSe:]FREQuency:STARt:LINK SPAN
CENTER FIXED	[SENSe:]FREQuency:STARt:LINK CENTer
STOP	
STOP MANUAL	[SENSe:]FREQuency:STOP <numeric_value>
START FIXED	[SENSe:]FREQuency:STOP:LINK STARt
SPAN FIXED	[SENSe:]FREQuency:STOP:LINK SPAN
CENTER FIXED	[SENSe:]FREQuency:STOP:LINK CENTer
CENTER	
CENTER MANUAL	[SENSe:]FREQuency:CENTer <numeric_value>
SPAN FIXED	[SENSe:]FREQuency:CENTer:LINK SPAN
START FIXED	[SENSe:]FREQuency:CENTer:LINK STARt
STOP FIXED	[SENSe:]FREQuency:CENTer:LINK STOP
FREQUENCY OFFSET	[SENSe:]FREQuency:OFFSet <numeric_value>

STEP

STEPSIZE MANUAL	[SENSe:]FREQuency:CENTer:STEP <numeric_value>
AUTO 0.1 * RBW	[SENSe:]FREQuency:CENTer:STEP:LINK RBW; [SENSe:]FREQuency:CENTer:STEP:LINK:FACTor 10PCT
AUTO 0.5 * RBW	[SENSe:]FREQuency:CENTer:STEP:LINK RBW; [SENSe:]FREQuency:CENTer:STEP:LINK:FACTor 50PCT
AUTO X * RBW	[SENSe:]FREQuency:CENTer:STEP:LINK RBW; [SENSe:]FREQuency:CENTer:STEP:LINK:FACTor <numeric_value>
AUTO 0.1 * SPAN	[SENSe:]FREQuency:CENTer:STEP:LINK SPAN; [SENSe:]FREQuency:CENTer:STEP:LINK:FACTor 10PCT
AUTO 0.5 * SPAN	[SENSe:]FREQuency:CENTer:STEP:LINK SPAN; [SENSe:]FREQuency:CENTer:STEP:LINK:FACTor 50PCT
AUTO X * SPAN	[SENSe:]FREQuency:CENTer:STEP:LINK SPAN; [SENSe:]FREQuency:CENTer:STEP:LINK:FACTor <numeric_value>
STEPSIZE = CENTER	no corresponding IEC/IEEE-bus command

SPAN

SPAN MANUAL	[SENSe:]FREQuency:SPAN <numeric_value>
ZERO SPAN	[SENSe:]FREQuency:SPAN 0HZ
FULL SPAN	[SENSe:]FREQuency:SPAN:FULL
LAST SPAN	no corresponding IEC/IEEE-bus command
CENTER FIXED	[SENSe:]FREQuency:SPAN:LINK CENTer
START FIXED	[SENSe:]FREQuency:SPAN:LINK START
STOP FIXED	[SENSe:]FREQuency:SPAN:LINK STOP

ZOOM	DISPlay[:WINDow<1|2>]:TRACe<1...4>:X[:SCALe]:ZOOM ON|OFF
MOVE ZOOM START	DISPlay[:WINDow<1|2>]:TRACe<1...4>:X[:SCALe]:ZOOM[:FREQuency]:STARt <numeric_value>
MOVE ZOOM STOP	DISPlay[:WINDow<1|2>]:TRACe<1...4>:X[:SCALe]:ZOOM[:FREQuency]:STOP <numeric_value>
MOVE ZOOM WINDOW	DISPlay[:WINDow<1|2>]:TRACe<1...4>:X[:SCALe]:ZOOM[:FREQuency]:CENTer <numeric_value>
ZOOM OFF	DISPlay[:WINDow<1|2>]:TRACe<1...4>:X[:SCALe]:ZOOM OFF

3.9.1.2 LEVEL Key Group

REF	
MAX LEVEL AUTO	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RVALue:AUTO ON
MAX LEVEL MANUAL	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RVALue:AUTO OFF; DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RVALue <numeric_value>
REF LEVEL	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RLEVel <numeric_value>
REF LEVEL OFFSET	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RLEVel:OFFSet <num_value>
GRID ABS/REL	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:MODE ABSolute|RELative
UNIT	--
dBm	CALCulate<1|2>:UNIT:POWer DBM
dBµV	CALCulate<1|2>:UNIT:POWer DBUV
dBµA	CALCulate<1|2>:UNIT:POWer DBUA
dBpW	CALCulate<1|2>:UNIT:POWer DBPW
VOLT	CALCulate<1|2>:UNIT:POWer VOLT
AMPERE	CALCulate<1|2>:UNIT:POWer AMPere
WATT	CALCulate<1|2>:UNIT:POWer WATT
dBmV	CALCulate<1|2>:UNIT:POWer DBMV
dB*/MHz	CALCulate<1|2>:UNIT:POWer DBUV_MHZ CALCulate<1|2>:UNIT:POWer DBUA_MHZ CALCulate<1|2>:UNIT:POWer DBMV_MHZ
PROBE CODE ON / OFF	UNIT:PROBe ON|OFF

RANGE	
LINEAR/%	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y:SPACing PERCent
LINEAR/dB	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y:SPACing LINear
LOG MANUAL	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y:SPACing LOGarithmic; DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe] <numeric_value>

3.9.1.3 INPUT Key

INPUT	
RF ATTEN MANUAL	INPut:ATTenuation <numeric_value>
ATTEN AUTO NORMAL	INPut:ATTenuation:AUTO:MODE NORMal; INPut:ATTenuation:AUTO ON
ATTEN AUTO LOW NOISE	INPut:ATTenuation:AUTO:MODE LNOise; INPut:ATTenuation:AUTO ON
ATTEN AUTO LOW DIST	INPut:ATTenuation:AUTO:MODE LDIStortion; INPut:ATTenuation:AUTO ON
MIXER LEVEL	INPut:MIXer <numeric value>
INPUT SELECT	--
RF INPUT 50 OHM	INPut:IMPedance 50
RF INPUT 75 OHM/RAM	INPut:IMPedance:CORRection RAM
RF INPUT 75OHM/RAZ	INPut:IMPedance:CORRection RAZ

3.9.1.4 MARKER Key Group

NORMAL	
MARKER 1..4	CALCulate<1|2>:MARKer<1...4>[:STATe] ON | OFF; CALCulate<1|2>:MARKer<1...4>:X <numeric value>; CALCulate<1|2>:MARKer<1...4>:Y?
ALL MARKER OFF	CALCulate<1|2>:MARKer<1...4>:AOFF

SIGNAL TRACK	CALCulate<1|2>:MARKer<1...4>:FUNCtion:STRack[:STATe] ON | OFF
MARKER INFO	DISPlay:WINDow<1|2>:MINFo ON | OFF (display) queries: CALCulate<1|2>:DELTamarker<1...4>:FUNCtion:PNOise:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:NDBDown:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:NOISe:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:SFACtor:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:RESult? ACPower| CPOWer| OBANdwidth| OBWidth| CN| CN0 CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:RMS:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MEAN:RESult?
MARKER ZOOM	CALCulate<1|2>:MARKer<1...4>:FUNCtion:ZOOM <numeric_value>
MARKER DEMOD	--
AM	CALCulate<1|2>:MARKer<1...4>:FUNCtion:DEModulation:SELect AM
FM	CALCulate<1|2>:MARKer<1...4>:FUNCtion:DEModulation:SELect FM
MKR DEMOD ON/OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:DEModulation[:STATe] ON | OFF
MKR STOP TIME	CALCulate<1|2>:MARKer<1..4>:FUNCtion:DEModulation:HOLDoff <num_value>
VOLUME	SYSTem:SPEaker:VOLume <numeric_value>
SIGNAL COUNT	CALCulate<1|2>:MARKer<1...4>:COUNt ON | OFF; CALCulate<1|2>:MARKer<1...4>:COUNt:FREQuency?
COUNTER RESOL	CALCulate<1|2>:MARKer<1...4>:COUNt:RESolution <numeric value>
NOISE	CALCulate<1|2>:MARKer<1...4>:FUNCtion:NOISe[:STATe] ON | OFF; CALCulate<1|2>:MARKer<1...4>:FUNCtion:NOISe:RESult?
POWER MEAS SETTINGS	
SET NO OF ADJ CHAN'S	[SENSe:]POWer:ACHannel:ACPairs
ACP STANDARD	CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:PRESet NADC | TETRA | PDC | PHS| CDPD | CDMA | NONE
CH FILTER ON/OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:CFILter ON | OFF
CHANNEL BANDWIDTH	[SENSe:]POWer:ACHannel:BANDwidth|BWIDth[:CHANnel] <numeric_value> [SENSe:]POWer:ACHannel:BANDwidth|BWIDth:ACHannel <numeric_value> [SENSe:]POWer:ACHannel:BANDwidth|BWIDth:ALTernate<1|2> <numeric_value>
CHANNEL SPACING	[SENSe:]POWer:ACHannel:SPACing[:UPPer] <numeric_value>

EDIT ACP LIMITS

```
CALCulate<1|2>:LIMit<1...8>:ACPower:ACHannel <num_value>,<num_value>
CALCulate<1|2>:LIMit<1...8>:ACPower:ACHannel:STATe ON | OFF
CALCulate<1|2>:LIMit<1...8>:ACPower:ALTernate<1|2>
                                    <numeric_value>, <numeric_value>
CALCulate<1|2>:LIMit<1...8>:ACPower:ALTernate<1|2>:STATe ON | OFF
```

LIMIT CHECK

```
CALCulate:LIMit:ACPower[:STATe] ON | OFF
CALCulate<1|2>:LIMit<1...8>:ACPower:ACHannel:RESult?
CALCulate<1|2>:LIMit<1...8>:ACPower:ALTernate<1|2>:RESult?
```

% POWER BANDWIDTH

```
[SENSe:]POWer: BANDwidth|BWIDth <numeric_value>
```

CHANNEL POWER

```
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:SELect CPOWer;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:RESult? CPOWer;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer[:STATe] OFF
```

CP/ACP ABS/REL

```
[SENSe:]POWer:ACHannel:MODE ABSolute|RELative
```

SET CP REFERENCE

```
[SENSe:]POWer:ACHannel:REFerence:AUTO ONCE
```

C/N

```
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:SELect CN;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:RESult? CN;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer[:STATe] OFF
```

C/No

```
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:SELect CN0;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:RESult? CN0;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer[:STATe] OFF
```

ADJACENT CHAN POWER

```
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:SELect ACPower;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:RESult? ACPower;
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer[:STATe] OFF
```

OCCUPIED PWR BANDW

```
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:SELect OBANdwidth | OBWidth
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer:RESult? OBANdwidth| OBWidth
CALCulate<1|2>:MARKer<1...4>:FUNCtion:POWer[:STATe] OFF
```

ADJUST CP SETTINGS

```
[SENSe:]POWer:ACHannel:PRESet ACPower|CPOWer|OBANdwidth|OBWidth|CN|CN0
```

STEP

STEPSIZE AUTO

```
CALCulate<1|2>:MARKer<1...4>:STEP:AUTO ON | OFF
```

STEPSIZE MANUAL

```
CALCulate<1|2>:MARKer<1...4>:STEP[:INCRement] <numeric_value>
```

MKR TO STEPSIZE

```
CALCulate<1|2>:MARKer<1...4>:FUNCtion:MSTep
```

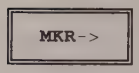
DELTA

DELTA 1...4

```
CALCulate<1|2>:DELTamarker<1...4>[:STATe]  ON | OFF
CALCulate<1|2>:DELTamarker<1...4>:X <numeric value>
CALCulate<1|2>:DELTamarker<1...4>:X:RELative?
CALCulate<1|2>:DELTamarker<1...4>:Y?
```

ALL DELTA OFF	CALCulate<1|2>:DELTamarker<1...4>:AOFF
DELTA MKR ABS REL	CALCulate<1|2>:DELTamarker<1...4>:MODE ABSolute | RELative
REFERENCE FIXED	CALCulate<1|2>:DELTamarker<1...4>:FUNCtion:FIXed[:STATe] ON | OFF
REFERENCE POINT	--
REF POINT FREQUENCY	CALCulate<1|2>:DELTamarker<1..4>:FUNCtion:FIXed:RPOint:X <num_value>
REF POINT LEVEL	CALCulate<1|2>:DELTamarker<1..4>:FUNCtion:FIXed:RPOint:Y <num_value>
REF POINT LVL OFFSET	CALCulate<1|2>:DELTamarker<1..4>:FUNCtion:FIXed:RPOint:Y:OFFSet <num_value>
REF POINT TIME	CALCulate<1|2>:DELTamarker<1..4>:FUNCtion:FIXed:RPOint:X <num_value>
PHASE NOISE	CALCulate<1|2>:DELTamarker<1...4>:FUNCtion:PNOise[:STATe] ON | OFF
STEP	
STEPSIZE AUTO	CALCulate<1|2>:DELTamarker<1...4>:STEP:AUTO ON | OFF
MANUAL STEPSIZE	CALCulate<1|2>:DELTamarker<1...4>:STEP[:INCRement] <numeric_value>
SEARCH	
NEXT PEAK	CALCulate<1|2>:MARKer<1...4>:MAXimum:NEXT CALCulate<1|2>:DELTamarker<1...4>:MAXimum:NEXT
NEXT PEAK LEFT	CALCulate<1|2>:MARKer<1...4>:MAXimum:LEFT CALCulate<1|2>:DELTamarker<1...4>:MAXimum:LEFT
NEXT PEAK RIGHT	CALCulate<1|2>:MARKer<1...4>:MAXimum:RIGHt CALCulate<1|2>:DELTamarker<1...4>:MAXimum:RIGHt
SELECT MARKER	no corresponding IEC/IEEE-bus command
ACTIVE MKR/DELTA	no corresponding IEC/IEEE-bus command

PEAK	CALCulate<1|2>:MARKer<1...4>:MAXimum[:PEAK] CALCulate<1|2>:DELTamarker<1...4>:MAXimum[:PEAK]
MIN	CALCulate<1|2>:MARKer<1...4>:MINimum[:PEAK] CALCulate<1|2>:DELTamarker<1...4>:MINimum[:PEAK]
NEXT MIN	CALCulate<1|2>:MARKer<1...4>:MINimum:NEXT CALCulate<1|2>:DELTamarker<1...4>:MINimum:NEXT
NEXT MIN LEFT	CALCulate<1|2>:MARKer<1...4>:MINimum:LEFT CALCulate<1|2>:DELTamarker<1...4>:MINimum:LEFT
NEXT MIN RIGHT	CALCulate<1|2>:MARKer<1...4>:MINimum:RIGHt CALCulate<1|2>:DELTamarker<1...4>:MINimum:RIGHt
EXLUDE LO ON OFF	CALCulate<1|2>:MARKer<1...4>:LOEXlude ON | OFF
PEAK EXCURSION	CALCulate<1|2>:MARKer<1...4>:PEXCursion <numeric_value>
N dB DOWN	CALCulate<1|2>:MARKer<1...4>:FUNCtion:NDBDown <numeric_value>
SEARCH LIM ON/OFF	CALCulate<1|2>:MARKer<1...4>:X:SLIMits[STATe] ON | OFF
SHAPE FACT 3/60	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SFACtor (60dB/3dB) CALCulate<1|2>:MARKer<1...4>:FUNCtion:SFACtor:STATe ON | OFF
SHAPE FACT 6/60	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SFACtor (60dB/6dB) CALCulate<1|2>:MARKer<1...4>:FUNCtion:SFACtor:STATe ON | OFF
SUM MKR ON/OFF	CALCulate<1|2>:MARKer<1..4>:FUNCtion:SUMMary:MAXimum[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:PPEak[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MPEak[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MIDDle[:STATe] ON | OFF
SUMMARY MARKER	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MAXimum:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:PPEak:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MPEak:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MIDDle:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:RMS:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MEAN:RESult?
AVERAGE ON/OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:AVERage ON | OFF
MEAN	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MEAN[:STATe] ON | OFF
PEAK HOLD ON/OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:PHOLd ON | OFF
RMS	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:RMS[:STATe] ON | OFF
ALL SUM MKR OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:AOFF




```
CALCulate<1|2>:MARKer<1...4>:FUNCtion:CENTer

CALCulate<1|2>:MARKer<1...4>:FUNCtion:CSTep

CALCulate<1|2>:MARKer<1...4>:FUNCtion:REFerence

CALCulate<1|2>:MARKer<1...4>:FUNCtion:STARt

CALCulate<1|2>:MARKer<1...4>:FUNCtion:STOP

CALCulate<1|2>:MARKer<1...4>:TRACe <numeric value>
CALCulate<1|2>:DELTamarker<1...4>:TRACe <numeric value>
```

3.9.1.5 LINES Key Group

D LINES

DISPLAY LINE 1/2

```
CALCulate:DLINe<1|2>:STATe  ON | OFF;
CALCulate:DLINe<1|2> <numeric_value>
```

FREQUENCY LINE 1/2

```
CALCulate:FLINe<1|2>:STATe ON | OFF;
CALCulate:FLINe<1|2> <numeric_value>
```

REFERENCE LINE

```
CALCulate:RLINe:STATe ON | OFF;
CALCulate:RLINe <numeric_value>
```

THRESHOLD LINE

```
CALCulate:THReshold ON | OFF;
CALCulate:THReshold <numeric_value>
```

TIME LINE 1/2

```
CALCulate:TLINe<1|2>:STATe ON | OFF;
CALCulate:TLINe<1|2> <numeric_value>
```

LIMITS

SELECT LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:NAME <string>;
CALCulate<1|2>:LIMit<1...8>:STATe ON | OFF
```

COPY LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:COPY 1...8 | <name>
```

DELETE LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:DELete
```

X OFFSET

```
CALCulate<1|2>:LIMit<1...8>:CONTrol:OFFset <numeric_value>
```

Y OFFSET

```
CALCulate<1|2>:LIMit<1...8>:UPPer:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:LOWer:OFFset <numeric_value>
```

EDIT LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:UNIT DBM| DBPW| WATT| DBUV| VOLT|DBUA|
       AMPere| DB| DBUV_MHZ| DBUA_MHZ| DEG| RAD| S| HZ| PCT | UNITLESS
CALCulate<1|2>:LIMit<1...8>:CONTrol[:DATA] <num_value>, <num_value>..
CALCulate<1|2>:LIMit<1...8>:CONTrol:DOMain   FREQuency|TIME
CALCulate<1|2>:LIMit<1...8>:CONTrol:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:CONTrol:MODE   RELative | ABSolute
CALCulate<1|2>:LIMit<1...8>:CONTrol:UNIT[:TIME] S | SYM
CALCulate<1|2>:LIMit<1...8>:UPPer[:DATA] <num_value>, <num_value>..
CALCulate<1|2>:LIMit<1...8>:UPPer:STATe   ON | OFF
CALCulate<1|2>:LIMit<1...8>:UPPer:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:UPPer:MARGin <numeric_value>
CALCulate<1|2>:LIMit<1...8>:UPPer:MODE   RELative | ABSolute
CALCulate<1|2>:LIMit<1...8>:LOWer[:DATA] <num_value>,<num_value>..
CALCulate<1|2>:LIMit<1...8>:LOWer:STATe ON | OFF
CALCulate<1|2>:LIMit<1...8>:LOWer:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:LOWer:MARGin <numeric_value>
CALCulate<1|2>:LIMit<1...8>:LOWer:MODE   RELative | ABSolute
```

NEW LIMIT LINE	see EDIT LIMIT LINE
NAME	CALCulate<1|2>:LIMit<1...8>:NAME <string>
DELETE VALUE	no corresponding IEC/IEEE-bus command
INSERT VALUE	no corresponding IEC/IEEE-bus command
VALUES	no corresponding IEC/IEEE-bus command
SAVE LIMIT LINE	automatically executed during IEC/IEEE-bus operation
SHIFT X LIMIT LINE	CALCulate<1|2>:LIMit<1...8>:CONTrol:SHIFt <numeric_value>
SHIFT Y LIMIT LINE	CALCulate<1|2>:LIMit<1...8>:UPPer:SHIFt <numeric_value> CALCulate<1|2>:LIMit<1...8>:LOWer:SHIFt <numeric_value>

3.9.1.6 TRACE Key Group

TRACE 1	
CLEAR/WRITE	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE WRITe
VIEW	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE VIEW
AVERAGE	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE AVERage
BLANK	DISPlay[:WINDow<1|2>]:TRACe<1...4>[:STATe] OFF
MAX HOLD	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE MAXHold
MIN HOLD	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE MINHold
HOLD CONT ON/OFF	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE:HCONtinuous ON|OFF
SWEEP COUNT	[SENSe:]SWEep:COUNt <numeric_value>
ANALOG TR ON/OFF	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE:ANALog ON|OFF
COPY..	TRACe:COPY TRACE1| TRACE2| TRACE3| TRACE4 , TRACE1| TRACE2| TRACE3| TRACE4

DETECTOR	--
AUTO SELECT	[SENSe:]DETector[:FUNCtion]:AUTO ON | OFF
DETECTOR AUTOPEAK	[SENSe:]DETector[:FUNCtion] APEak
DETECTOR MAX PEAK	[SENSe:]DETector[:FUNCtion] POSitive
DETECTOR MIN PEAK	[SENSe:]DETector[:FUNCtion] NEGative
DETECTOR SAMPLE	[SENSe:]DETector[:FUNCtion] SAMPle
DETECTOR RMS	[SENSe:]DETector[:FUNCtion] RMS
DETECTOR AVERAGE	[SENSe:]DETector[:FUNCtion] AVERage
TRACE MATH	--
T1-REF ->T1	CALCulate<1|2>:MATH<1...4>[:EXPRession][:DEFine] <expr>
T1-T2/T3/T4 +REF->T1	CALCulate<1|2>:MATH<1...4>[:EXPRession][:DEFine] <expr>
TRACE MATH OFF	CALCulate<1|2>:MATH<1...4>:STATe ON | OFF
ADJUST TO TRACE	no corresponding IEC/IEEE-bus command

3.9.1.7 SWEEP Key Group

COUPLING	
RES BW AUTO	[SENSe:]BANDwidth|BWIDth[:RESolution]:AUTO ON | OFF
RES BW MANUAL	[SENSe:]BANDwidth|BWIDth[:RESolution] <numeric_value>
VIDEO BW AUTO	[SENSe:]BANDwidth|BWIDth:VIDeo:AUTO ON | OFF
VIDEO BW MANUAL	[SENSe:]BANDwidth|BWIDth:VIDeo <numeric_value>
COUPLING DEFAULT	[SENSe:]BANDwidth|BWIDth[:RESolution]:AUTO ON; [SENSe:]BANDwidth|BWIDth:VIDeo:AUTO ON; [SENSe:]SWEep:TIME:AUTO ON
RBW 1kHz ANA/DIG	[SENSe:]BANDwidth|BWIDth[:RESolution]:MODE ANALog | DIGital
RBW <=1kHz FFT/NORM	[SENSe:]BANDwidth|BWIDth[:RESolution]:MODE:FFT ON | OFF
SWEEP TIME AUTO	[SENSe:]SWEep:TIME:AUTO ON | OFF
SWEEP TIME MANUAL	[SENSe:]SWEep:TIME <numeric_value>
MAIN PLL BANDWIDTH	[SENSe:]BANDwidth|BWIDth:PLL AUTO | HIGH | MEDium | LOW
COUPLING RATIO	--
RBW / VBW SINE [1]	[SENSe:]BANDwidth|BWIDth:VIDeo SINe
RBW / VBW MANUAL	[SENSe:]BANDwidth|BWIDth:VIDeo <numeric_value>
RBW / VBW NOISE [10]	[SENSe:]BANDwidth|BWIDth:VIDeo NOISe
RBW / VBW PULSE [.1]	[SENSe:]BANDwidth|BWIDth:VIDeo PULSe
SPAN / RBW AUTO [50]	[SENSe:]BANDwidth|BWIDth[:RESolution]:RATio 0.02
SPAN / RBW MANUAL	[SENSe:]BANDwidth|BWIDth[:RESolution]:RATio <numeric_value>

TRIGGER	
FREE RUN	TRIGger[:SEQuence]:SOURce IMMediate
LINE	TRIGger[:SEQuence]:SOURce LINE
VIDEO	TRIGger[:SEQuence]:SOURce VIDeo TRIGger[:SEQuence]:LEVel:VIDeo <numeric value>
EXTERN	TRIGger[:SEQuence]:SOURce EXTernal TRIGger[:SEQuence]:LEVel[:EXTernal] <numeric_value>
RF POWER	TRIGger[:SEQuence]:SOURce RFPower
SLOPE POS/NEG	TRIGger[:SEQuence]:SLOPe POSitive|NEGative
TRIGGER DELAY	TRIGger[:SEQuence]:HOLDoff <numeric_value>
SWEEP	
CONTINUOUS SWEEP	INITiate:CONTinuous ON
SINGLE SWEEP	INITiate:CONTinuous OFF
SWEEP COUNT	[SENSe:]SWEep:COUNt <numeric_value>
SGL SWEEP DISP OFF	INITiate:DISPlay ON | OFF
GATE ON/OFF	[SENSe:]SWEep:EGATe ON | OFF
GATE SETTINGS	--
GATE LEVEL	[SENSe:]SWEep:EGATe:LEVel <numeric_value>
GATE MODE LEVEL/EDGE	[SENSe:]SWEep:EGATe:TYPE LEVel | EDGE
GATE POL POS/NEG	[SENSe:]SWEep:EGATe:POLarity POSitive | NEGative

GATE DELAY	[SENSe:]SWEep:EGATe:HOLDoff <numeric_value>
GATE LENGTH	[SENSe:]SWEep:EGATe:LENGth <numeric_value>
GATE EXTERN	[SENSe:]SWEep:EGATe:SOURce EXTernal
GATE RF POWER	[SENSe:]SWEep:EGATe:SOURce RFPower
GAP SWEEP ON/OFF	[SENSe:]SWEep:GAP ON | OFF
GAP SWEEP SETTINGS	--
TRIGGER LEVEL	TRIGger[:SEQuence]:LEVel:VIDeo <numeric value>
PRE TRIGGER	[SENSe:]SWEep:GAP:PRETrigger <numeric_value>
GAP LENGTH	[SENSe:]SWEep:GAP:LENGth <numeric_value>
TRG TO GAP TIME	[SENSe:]SWEep:GAP:TRGTogap <numeric_value>

3.9.2 Basic Instrument - General Device Settings

3.9.2.1 DATA VARIATION Key Group

HOLD	
LOCK ALL	no corresponding IEC/IEEE-bus command
LOCK DATA	no corresponding IEC/IEEE-bus command
UNLOCK	no corresponding IEC/IEEE-bus command
STEP	if needed, the step width is entered in the subsystem of the corresponding parameter.
STEPSIZE AUTO	--
STEPSIZE MANUAL	--

3.9.2.2 SYSTEM Key Group

DISPLAY	
ACTIVE SCREEN A	The screen is selected via the numeric suffix of the individual commands.
FULL SCREEN	`DISPlay:FORmat SINGle`
SPLIT SCREEN	`DISPlay:FORmat SPLit`
SCREEN COUPLING	`--`
COUPLING CONTROL	`INSTrument:COUPle CONTrol`
HORIZONTAL SCALING	`INSTrument:COUPle X`
MODE COUPLED	`INSTrument:COUPle MODE`
SCREENS UNCOUPLED	`INSTrument:COUPle NONE | ALL`
VERTICAL SCALING	`INSTrument:COUPle Y`

CONFIG DISPLAY	-
SELECT OBJECT	--
BRIGHTNESS	DISPlay:CMAP:HSL <hue>,<sat>,<lum>
DATA ENTRY	--
DATAENTRY X	no corresponding IEC/IEEE-bus command
DATAENTRY Y	no corresponding IEC/IEEE-bus command
DEFAULT POSITION	no corresponding IEC/IEEE-bus command
DATAENTRY OPAQUE	no corresponding IEC/IEEE-bus command
PREDEFINED COLORS	DISPlay:CMAP<1...13>:PDEFined BLACk | BLUE | BROWn | GREen | CYAN | RED | MAGenta | YELLow | WHITe | DGRAy | LGRAy | LBLUe | LGREen | LCYan | LRED | LMAGenta
DEFAULT COLORS	DISPlay:CMAP<1...13>:DEFault
FREQUENCY ON/OFF	DISPlay:ANNotation:FREQuency ON|OFF
LOGO ON/OFF	DISPlay:LOGO ON|OFF
SATURATION	DISPlay:CMAP<1...13>:HSL <hue>,<sat>,<lum>
TINT	DISPlay:CMAP<1...13>:HSL <hue>,<sat>,<lum>
TIME ON OFF	DISPlay[:WINDow<1|2>]:TIME ON | OFF
DISPLAY COMMENT	DISPlay[:WINDow<1|2>]:TEXT[:DATA] <string> DISPlay[:WINDow<1|2>]:TEXT:STATe ON | OFF
CAL	
CAL CORR ON/OFF	CALibration:STATe ON | OFF
CAL LO SUPP	CALibration:LOSuppression?
CAL LOG	CALibration:LDETector?

CAL RES BW	CALibration:BANDwidth|BWIDth[:RESolution]?
CAL SHORT	CALibration:SHORt?
CAL TOTAL	CALibration[:ALL]?
CAL RESULTS	no corresponding IEC/IEEE-bus command
CAL I/Q	CALibration:IQ?
PRESEL PEAK	CALibration:PPEak?
INFO	
FIRMWARE VERSION	*IDN?
HARDWARE+ OPTIONS	*OPT?
SELFTEST	*TST?
EXECUTE TESTS	*TST?
SYSTEM MESSAGES	SYSTem:ERRor?
CLEAR ALL MESSAGES	--
CLEAR MESSAGE	SYSTem:ERRor?
UPDATE MESSAGES	--

3.9.2.3 CONFIGURATION Key Group

MODE	The submenus are described under the associated operating mode.
ANALYZER	`INSTrument[:SELect] SANalyzer`
VECTOR ANALYZER	`INSTrument[:SELect] SANalyzer | DDEMod`
TRACKING GENERATOR	`OUTPut:[:STATe] ON | OFF`
TV DEMOD	`[SENSe:]TV[:STATe] ON | OFF`
SETUP	
TRANSDUCER	--
TRANSDUCER FACTOR	`[SENSe:]CORRection:TRANsducer:SELect <name>` `[SENSe:]CORRection:TRANsducer[:STATe] ON | OFF`
TRANSDUCER SET	`[SENSe:]CORRection:TSET:SELect <name>` `[SENSe:]CORRection:TSET[:STATe] ON | OFF`
EDIT TRD FACTOR	`[SENSe:]CORRection:TRANsducer:SCALing LINear|LOGarithmic`
TRD FACTOR NAME	`[SENSe:]CORRection:TRANsducer:SELect <name>`
TRD FACTOR UNIT	`[SENSe:]CORRection:TRANsducer:UNIT <string>`
TRD FACTOR VALUES	`[SENSe:]CORRection:TRANsducer:DATA <freq>,<level>..`
INSERT LINE	no corresponding IEC/IEEE-bus command
DELETE LINE	no corresponding IEC/IEEE-bus command
SAVE TRD FACTOR	automatically executed during IEC/IEEE-bus operation
EDIT TRD SET	--
TRANSD SET NAME	`[SENSe:]CORRection:TSET:SELect <name>`
TRANSD SET UNIT	`[SENSe:]CORRection:TSET:UNIT <string>`

TRANSD SET RANGES	`[SENSe:]CORRection:TSET:RANGe<1...10> <freq>,<freql>,<name>..`
INSERT LINE	no corresponding IEC/IEEE-bus command
DELETE LINE	no corresponding IEC/IEEE-bus command
SAVE TRD SET	automatically executed during IEC/IEEE-bus operation
NEW FACT/SET	see *EDIT TRD FACTOR* or *EDIT TRD SET*
DELETE FACTOR/SET	`[SENSe:]CORRection:TRANsducer:DELete` `[SENSe:]CORRection:TSET:DELete`
OPTIONS	no corresponding IEC/IEEE-bus command
EXTERNAL REFERENCE	`[SENSe:]ROSCillator:EXTernal:FREQuency <numeric_value>`
REFERENCE INT/EXT	`[SENSe:]ROSCillator:SOURce INTernal|EXTernal`
GENERAL SETUP	`--`
GPIB ADDRESS	`SYSTem:COMMunicate:GPIB[:SELF]:ADDRess 0...30`
KEY CLICK ON/OFF	no corresponding IEC/IEEE-bus command

USER PORT A/B	`INPut:UPORt<1|2>[:VALue]?`
	`INPut:UPORt<1|2>:STATe ON | OFF`
	`OUTPut:[:STATe] ON | OFF`
	`OUTPut:UPORt<1|2>[:VALue] <Binary>`

COM PORT 1/2	`SYSTem:COMMunicate:SERial<1|2>:CONTrol:DTR IBFull | OFF`
	`SYSTem:COMMunicate:SERial<1|2>:CONTrol:RTS IBFull | OFF`
	`SYSTem:COMMunicate:SERial<1|2>[:RECeive:]BAUD <numeric_value>`
	`SYSTem:COMMunicate:SERial<1|2>[:RECeive]:BITS 7 | 8`
	`SYSTem:COMMunicate:SERial<1|2>:RECeive:PARity[:TYPE] EVEN | ODD | NONE`
	`SYSTem:COMMunicate:SERial<1|2>[:RECeive]:SBITs 1|2`
	`SYSTem:COMMunicate:SERial<1|2>[:RECeive]:PACE XON | NONE`

DATE	`SYSTem:DATE <num>,<num>,<num>`
EXTERNAL KEYBOARD	no corresponding IEC/IEEE-bus command
TIME	`SYSTem:TIME 0...23, 0...59, 0...59`
MOUSE	no corresponding IEC/IEEE-bus command

SERVICE	-
ENTER PASSWORD	SYSTem:PASSword[:CENable] <string>
INPUT CAL	DIAGnostic:SERVice:INPut[:SELect] CALibration
INPUT RF	DIAGnostic:SERVice:INPut[:SELect] RF
NOISE SOURCE	DIAGnostic:SERVice:NSOurce ON | OFF
REFERENCE ADJUST	-
REFERENCE	[SENSe:]ROSCillator:[INTernal:]TUNe <numeric_value>
REFERENCE PROG	[SENSe:]ROSCillator:[INTernal:]TUNe:SAVe
SERVICE FUNCTION	DIAGnostic:SERVice:FUNCtion <numeric_value>,<numeric_value>...
HARMONIC GENERATOR	DIAGnostic:SERVice:HGENerator OFF | 10KHZ | 100KHZ | BALanced

3.9.2.4 STATUS Key Group

LOCAL	Device message "Go to LOCAL (GTL)"

3.9.2.5 HARDCOPY Key Group

START	HCOPy[:IMMediate<1|2>]
SETTINGS	
COPY SCREEN	HCOPy:ITEM:ALL
COPY TABLE	HCOPy:ITEM:WINDow<1|2>:TABle:STATe ON | OFF
COPY TRACE	HCOPy:ITEM:WINDow<1|2>:TRACe:STATe ON | OFF
TRC COLOR AUTO INC	HCOPy:ITEM:WINDow<1|2>:TRACe:CAINcrement ON | OFF
SELECT QUADRANT	--
FULL PAGE	HCOPy:PAGE:DIMensions:FULL
LOWER LEFT	HCOPy:PAGE:DIMensions:QUADrant 2
LOWER RIGHT	HCOPy:PAGE:DIMensions:QUADrant 4
UPPER LEFT	HCOPy:PAGE:DIMensions:QUADrant 1
UPPER RIGHT	HCOPy:PAGE:DIMensions:QUADrant 3
ENTER TEXT	--
COMMENT SCREEN A/B	HCOPy:ITEM:WINDow<1|2>:TEXT <string>
TITLE	HCOPy:ITEM:LABel:TEXT <string>
HARDCOPY DEVICE	HCOPy:DEVice:LANGuage HPGL | PCL4 | PCL5 | POSTscript | ESCP | WMF|PCX | HP7470 | EPSON24| EPSON24C | PCL4_C | PCL4_C3 | PCL4_H | PCL4_CH | PCL4_C3H | LASERJ | DESKJ | DESKJ_C | DESKJ_C3 | DESKJ_H | DESKJ_CH | DESKJC3H | HPGL_LS | HP7470LS
SETTINGS DEVICE 1/2	HCOPy:DESTination<1|2> <string> MMEMory:NAME <file_name> HCOPy:DEVice:PRESet<1|2> ON|OFF HCOPy:DEVice:RESolution<1|2> 150|300 HCOPy:ITEM:FFEed<1|2>:STATe ON|OFF HCOPy:PAGE:ORIentation<1|2> LANDscape | PORTrait
ENABLE DEV1/DEV2	The output device to be used is specified as a numeric suffix <1|2> after the command HCOPy:IMMediate
COLOR ON/OFF	HCOPy:DEVice:COLor ON | OFF

3.9.2.6 MEMORY Key Group

CONFIG	
EDIT PATH	MMEMory:MSIS <device> MMEMory:CDIRectory <directory_name>
DELETE	MMEMory:DELete <file_name> MMEMory:RDIRectory <directory_name>
FORMAT DISK	MMEMory:INITialize <msus>
MAKE DIRECTORY	MMEMory:MDIRectory <directory_name>
RENAME	MMEMory:MOVE <file_source>,<file_destination>
SORT MODE	no corresponding IEC/IEEE-bus command
COPY	MMEMory:COPY <file_source>,<file_destination>
SAVE	
DATA SET LIST	--
EDIT COMMENT	MMEMory:COMMent <string>
EDIT NAME	MMEMory:STORe:STATe 1,<file_name>
EDIT PATH	The path is included in the file names.
DATA SET CLEAR	MMEMory:CLEar:STATe 1,<file_name>
DATA SET CLEAR ALL	MMEMory:CLEar:ALL
SELECT ITEMS TO SAVE	--

DEFAULT CONFIG

```
MMEMory:SELect[:ITEM]:DEFault
```

DISABLE ALL ITEMS

```
MMEMory:SELect[:ITEM]:NONE
```

ENABLE ALL ITEMS

```
MMEMory:SELect[:ITEM]:ALL
```

SELECT ITEMS

```
MMEMory:SELect[:ITEM]:GSETup ON|OFF
MMEMory:SELect[:ITEM]:HWSettings ON|OFF
MMEMory:SELect[:ITEM]:TRACe<1...4> ON|OFF
MMEMory:SELect[:ITEM]:LINes[:ACTive] ON|OFF
MMEMory:SELect[:ITEM]:LINes:ALL ON|OFF
MMEMory:SELect[:ITEM]:CSETup ON|OFF
MMEMory:SELect[:ITEM]:HCOPy ON|OFF
MMEMory:SELect[:ITEM]:MACRos ON|OFF
MMEMory:SELect[:ITEM]:SCData ON|OFF
MMEMory:SELect[:ITEM]:TRANsducer[:ACTive] ON|OFF
MMEMory:SELect[:ITEM]:TRANsducer:ALL ON|OFF
```

RECALL

AUTO RECALL

```
MMEMory:LOAD:AUTO 1,<file_name>
```

DATA SET LIST

```
--
```

EDIT NAME

```
MMEMory:LOAD:STATe 1,<file_name>
```

EDIT PATH

The path is included in the file names.

DATA SET CLEAR

```
MMEMory:CLEar:STATe 1,<file_name>
```

DATA SET CLEAR ALL

```
MMEMory:CLEar:ALL
```

SELECT ITEMS TO RECALL

```
--
```

DEFAULT CONFIG

```
MMEMory:SELect[:ITEM]:DEFault
```

DISABLE ALL ITEMS

```
MMEMory:SELect[:ITEM]:NONE
```

ENABLE ALL ITEMS

```
MMEMory:SELect[:ITEM]:ALL
```

SELECT ITEMS

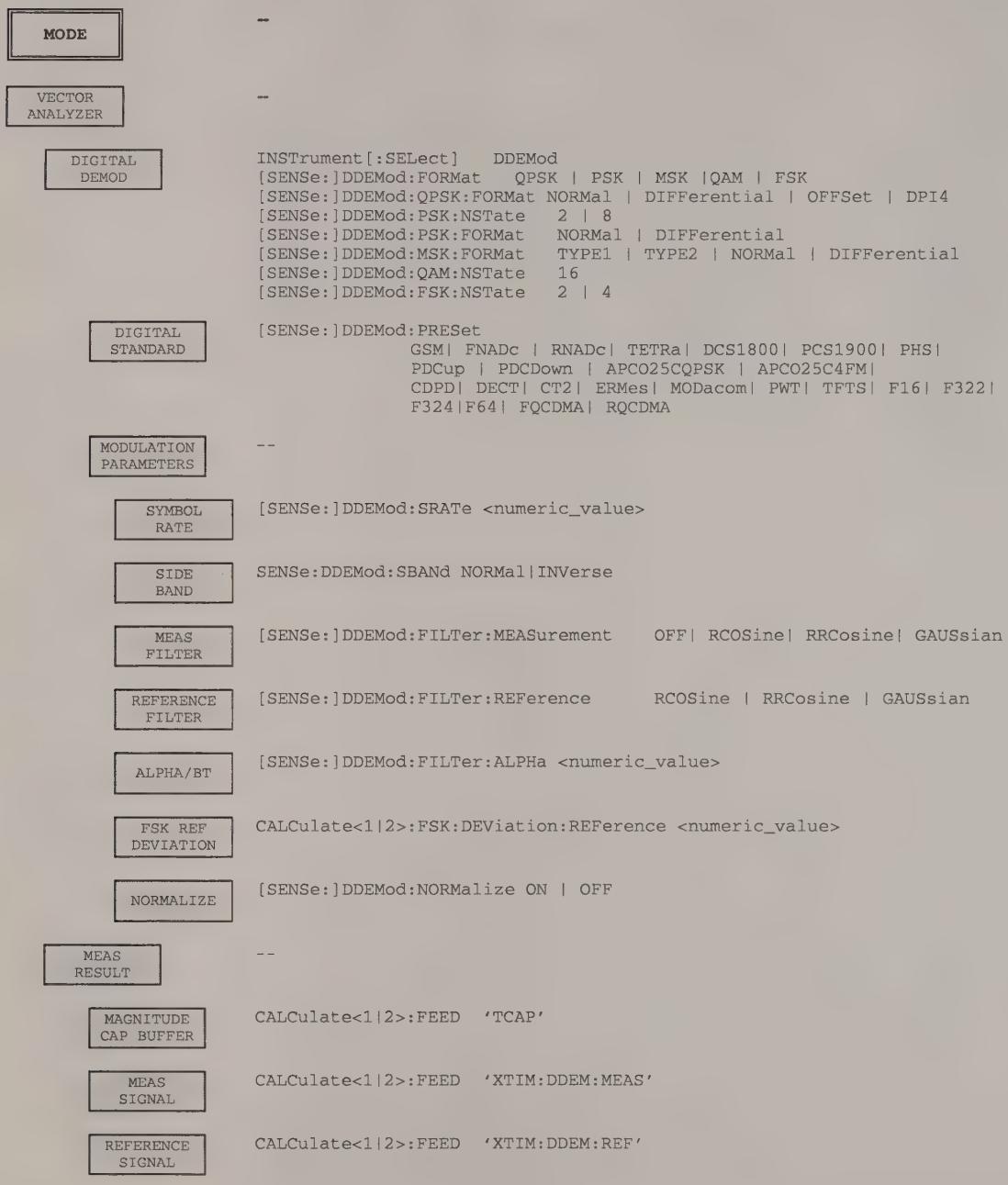
```
MMEMory:SELect[:ITEM]:GSETup ON|OFF
MMEMory:SELect[:ITEM]:HWSettings ON|OFF
MMEMory:SELect[:ITEM]:TRACe<1...4> ON|OFF
MMEMory:SELect[:ITEM]:LINes[:ACTive] ON|OFF
MMEMory:SELect[:ITEM]:LINes:ALL ON|OFF
MMEMory:SELect[:ITEM]:CSETup ON|OFF
MMEMory:SELect[:ITEM]:HCOPy ON|OFF
MMEMory:SELect[:ITEM]:CDATa ON|OFF
MMEMory:SELect[:ITEM]:MACRos ON|OFF
MMEMory:SELect[:ITEM]:SCData ON|OFF
MMEMory:SELect[:ITEM]:TRANsducer[:ACTive] ON|OFF
MMEMory:SELect[:ITEM]:TRANsducer:ALL ON|OFF
```

3.9.2.7 USER Key Group

MACRO 1...7	no corresponding IEC/IEEE-bus command
DEFINE MACRO	no corresponding IEC/IEEE-bus command
RECORD ON/OFF	no corresponding IEC/IEEE-bus command
DEFINE PAUSE	no corresponding IEC/IEEE-bus command
DELETE MACRO	no corresponding IEC/IEEE-bus command
MACRO TITLE	no corresponding IEC/IEEE-bus command
SELECT MACRO	no corresponding IEC/IEEE-bus command

3.9.3 Vector Signal Analysis Mode (Option FSE-B7)

3.9.3.1 CONFIGURATION Key Group – Digital Demodulation



FREQUENCY	CALCulate<1|2>:FORMat FREQuency
MAGNITUDE	CALCulate<1|2>:FORMat MAGNitude
PHASE	CALCulate<1|2>:FORMat PHASe
PHASE WRAP ON/OFF	CALCulate<1|2>:FORMat PHASe | UPHase
REAL/IMAG PART	CALCulate<1|2>:FORMat RIMag
EYE DIAG [I]	CALCulate<1|2>:FORMat IEYE
EYE DIAG [Q]	CALCulate<1|2>:FORMat QEYE
EYE DIAG TRELLIS	CALCulate<1|2>:FORMat TEYE
EYE LENGTH	DISPlay[:WINDow<1|2>]:TRACe<1...4>:EYE:COUNt <numeric_value>
POLAR [IQ] CONSTELL	CALCulate<1|2>:FORMat CONS
POLAR [IQ] VECTOR	CALCulate<1|2>:FORMat COMP
SYMBOL DISPLAY	CALCulate<1|2>:FEED 'XTIM:DDEM:SYMB'
EYE DIAG [FREQ]	CALCulate<1|2>:FORMat FEYE
EYE LENGTH	CALCulate<1|2>:FORMat FREQuency
FREQUENCY	CALCulate<1|2>:FORMat MAGNitude
MAGNITUDE	CALCulate<1|2>:FORMat MAGNitude
SYMBOL DISPLAY	CALCulate<1|2>:FEED 'XTIM:DDEM:SYMB'
ERROR SIGNAL	CALCulate<1|2>:FEED 'XTIM:DDEM:ERR:MPH'
FREQUENCY	CALCulate<1|2>:FORMat FREQuency
MAGNITUDE	CALCulate<1|2>:FORMat MAGNitude
PHASE	CALCulate<1|2>:FORMat PHASe

REAL/IMAG PART	CALCulate<1|2>:FORMat RIMag
ERROR SIGNAL	CALCulate<1|2>:FEED 'XTIM:DDEM:ERR:MPH'
ERROR VECT MAGNITUDE	CALCulate<1|2>:FEED 'XTIM:DDEM:ERR:VECT'
MAGNITUDE	CALCulate<1|2>:FORMat MAGNitude
POLAR [IQ] CONSTELL	CALCulate<1|2>:FORMat CONS
POLAR [IQ] VECTOR	CALCulate<1|2>:FORMat COMP
SYMB TABLE / ERRORS	CALCulate<1|2>:FEED 'XTIM:DDEM:SYMB'
MEMORY SIZE	[SENSe:]TCAPture:LENGth 1024 | 2048 | 4096 | 8192 | 16384
FRAME LENGTH	[SENSe:]DDEMod:SEARch:TIME <numeric_value>
RESULT LENGTH	[SENSe:]DDEMod:TIME <numeric_value>
POINTS PER SYMBOL	[SENSe:]DDEMod:PRATe 1| 2| 4| 8| 16

3.9.3.2 CONFIGURATION Key Group – Analog Demodulation

MODE	-
VECTOR ANALYZER	--
ANALOG DEMOD	INSTrument[:SELect] ADEMod
MODULATION PARAMETER	--
HIGH PASS AFFILTER	SENSe:FILTer:HPASs[:STATe] ON|OFF SENSe:FILTer:HPASs:FREQuency <numeric_value>
LOW PASS AF FILTER	SENSe:FILTer[:LPASs][:STATe] ON|OFF SENSe:FILTer[:LPASs]:FREQuency <numeric_value>
WEIGHTING AF FILTER	SENSe:FILTer:CCITt[:STATe] ON|OFF SENSe:FILTer:CMESsage[:STATe] ON|OFF
AF COUPL'G AC DC	SENSe:ADEMod:AF:COUPling AC|DC
SQUELCH ON OFF	SENSe:ADEMod:SQUelch[:STATe] ON|OFF

SQUELCH LEVEL	SENSe:ADEMod:SQUelch:LEVel <numeric_value>
SIDE BAND NORM INV	SENSe:ADEMod:SBAND NORMal|INVerse
AM/FM DEEMPH	SENSe:FILTer:DEMPhasis:TCONstant <numeric_value>
PRE DISPL ON OFF	SENSe:FILTer:DEMPhasis:LINK DISPlay|AUDio
DEEMPHASIS ON OFF	SENSe:FILTer:DEMPhasis[:STATe] ON|OFF
MEAS RESULT	
AM SIGNAL	CALCulate<1|2>:FEED 'XTIM:AM'
FM SIGNAL	CALCulate<1|2>:FEED 'XTIM:FM'
PM SIGNAL	CALCulate<1|2>:FEED 'XTIM:PM'
MODULATION SUMMARY	CALCulate<1|2>:FEED 'XTIM:AMSummary' CALCulate<1|2>:FEED 'XTIM:FMSummary' CALCulate<1|2>:FEED 'XTIM:PMSummary' CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:AM[:RESult?] PPEak | MPEak | MIDDle | RMS CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:FM[:RESult?] PPEak | MPEak | MIDDle | RMS | RDEV CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:PM[:RESult?] PPEak | MPEak | MIDDle | RMS CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:AFRequency[:RESult?] CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:FERRor [:RESult?] CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:SINad:RESult? CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:CARRier[:RESult?]
SUMMARY SETTINGS	--
AVERAGE HOLD ON	SENSe:MSUMmary:AHOLd[:STATe] ON|OFF
SWEEP COUNT	[SENSe:]SWEep:COUNt <numeric_value>
RELUNIT DB %	CALCulate<1|2>:UNIT:POWer DB|PCT
INDICATION ABS REL	SENSe:MSUMmary:MODE ABSolute | RELative
SET REFERENCE	SENSe:MSUMmary:REFerence <numeric_value>
MEAS-> REF	SENSe:MSUMmary:REFerence:AUTO ONCe
MEAS TIME	SENSe:MSUMmary:MTIMe <numeric_value>
SINAD 1kHz ON OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:SINad[:STATe] CALCulate<1|2>:MARKer<1...4>:FUNCtion:ADEMod:SINad:RESult?

REAL TIME ON OFF	SENSe:ADEMod:RTIMe[:STATe] ON|OFF
SENSITIV AF OUTPUT	OUTPut:AF:SENSitivity <numeric_value>
VOLUME	SYSTem:SPEaker:VOLume <numeric_value>
DEMOD BANDWIDTH	SENSe:BANDwidth|BWIDth:DEMod <numeric_value>

3.9.3.3 FREQUENCY Key Group

CENTER	[SENSe:]FREQuency:CENTer <numeric_value>
FREQUENCY OFFSET	[SENSe:]FREQuency:OFFSet <numeric_value>

3.9.3.4 LEVEL Key Group

REF	--
REF LEVEL	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RLEVel <numeric_value>
RANGE	--
REF VALUE X AXIS	DISPlay[:WINDow<1|2>]:TRACe<1...4>:X[:SCALe]:RVALue <numeric_value>
REF VALUE Y AXIS	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RVALue <numeric_value>
Y PER DIV	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:PDIVision <numeric value>
REF VALUE POSITION	DISPlay[:WINDow<1|2>]:TRACe<1...4>:Y[:SCALe]:RPOSition 0...100PCT
TIME/DIV	DISPlay[:WINDow<1|2>]:TRACe<1...4>:X[:SCALe]:TPDivision <numeric_value>
SCALE UNIT	CALCulate<1|2>:UNIT:POWer DBM| V| W| DB| PCT| UNITLESS| DBPW| WATT| DBUV| DBMV | VOLT| DBUA| AMPere
SENSITIV AF OUTPUT	OUTPut:AF:SENSitivity <numeric_value>
VOLUME	SYSTem:SPEaker:VOLume <numeric_value>

3.9.3.5 INPUT Key Group

INPUT	
RF ATTEN MANUAL	INPut:ATTenuation <numeric_value>
ATTEN AUTO LOW DIST	INPut:ATTenuation:AUTO:MODE LDIStortion; INPut:ATTenuation:AUTO ON
ATTEN AUTO LOW NOISE	INPut:ATTenuation:AUTO:MODE LNOise; INPut:ATTenuation:AUTO ON
ATTEN AUTO NORMAL	INPut:ATTenuation:AUTO:MODE NORMal; INPut:ATTenuation:AUTO ON
MIXER LEVEL	INPut:MIXer <numeric value>
INPUT SELECT	-
RF INPUT 50 OHM	INPut:IMPedance 50
RF INPUT 75 OHM/RAM	INPut:IMPedance:CORRection RAM
RF INPUT 75OHM/RAZ	INPut:IMPedance:CORRection RAZ

3.9.3.6 MARKER Key Group

NORMAL	
MARKER 1..2	CALCulate<1|2>:MARKer<1...2>[:STATe] ON | OFF; CALCulate<1|2>:MARKer<1...2>:X <numeric value>; CALCulate<1|2>:MARKer<1...2>:Y?
COUPLED MARKER	CALCulate<1|2>:MARKer<1...2>:COUPling[:STATe] ON | OFF
POLAR MARKER DEG/ RAD	CALCulate<1|2>:UNIT:ANGLe DEG | RAD
POLAR MARKER R/I / MA/PH	CALCulate<1|2>:MARKer<1...2>:READout MPHase | RIMaginary
ALL MARKER OFF	CALCulate<1|2>:MARKer<1...2>:AOFF
MARKER INFO	CALCulate<1|2>:MARKer<1...2>:FUNCtion:DDEMod:RESult? MERM| MEPK| MEPS| PERM| PEPK| PEPS| EVRM| EVPK| EVPS| IQOF| IQIM| ADR| FERR| DEV| FSRM| FSPK| FSPS| RHO| FEPK CALCulate<1|2>:MARKer<1...2>:FUNCtion:SUMMary:MAXimum:RESult? CALCulate<1|2>:MARKer<1...2>:FUNCtion:SUMMary:PPEak:RESult? CALCulate<1|2>:MARKer<1...2>:FUNCtion:SUMMary:MPEak:RESult? CALCulate<1|2>:MARKer<1...2>:FUNCtion:SUMMary:MIDDle:RESult? CALCulate<1|2>:MARKer<1...2>:FUNCtion:SUMMary:RMS:RESult? CALCulate<1|2>:MARKer<1...2>:FUNCtion:SUMMary:MEAN:RESult?

DELTA	
ALL DELTA OFF	CALCulate<1|2>:DELTamarker<1...4>[:STATe] ON | OFF CALCulate<1|2>:DELTamarker<1...4>:X <numeric value> CALCulate<1|2>:DELTamarker<1...4>:Y?
DELTA 1/2	CALCulate<1|2>:DELTamarker<1...4>:AOFF
DELTA ABS / REL	CALCulate<1|2>:DELTamarker<1...4>:MODE ABSolute | RELative
MARKER SEARCH	
ACTIVE MKR / DELTA	--
MIN	CALCulate<1|2>:MARKer<1...4>:MINimum[:PEAK] CALCulate<1|2>:DELTamarker<1...4>:MINimum[:PEAK]
SEARCH LIMIT ON/OFF	CALCulate<1|2>:MARKer<1...4>:X:SLIMits[STATe] ON | OFF
SELECT MARKER	--
SUMMARY MARKER	--
+PEAK	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:PPEak[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:PPEak:RESult?
-PEAK	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MPEak[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MPEak:RESult?
±PEAK/2	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MIDDle[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MIDDle:RESult?
RMS	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:RMS[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:RMS:RESult?
MAX |PEAK|	CALCulate<1|2>:MARKer<1..4>:FUNCtion:SUMMary:MAXimum[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...2>:FUNCtion:SUMMary:MAXimum:RESult?
ALL SUM MKR OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:AOFF
AVERAGE ON / OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:AVERage ON | OFF
MEAN	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MEAN[:STATe] ON | OFF CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:MEAN:RESult?
PEAK HOLD ON / OFF	CALCulate<1|2>:MARKer<1...4>:FUNCtion:SUMMary:PHOLd ON | OFF
SWEEP COUNT	[SENSe:]SWEep:COUNt <numeric_value>

MKR ->

ACTIVE MKR / DELTA

no corresponding IEC/IEEE-bus command

MKR → TRACE

```
CALCulate<1|2>:MARKer<1...4>:TRACe <numeric value>
```

3.9.3.7 LINES Key Group

D LINES

--

DISPLAY LINE 1/2

```
CALCulate:DLINe<1|2>:STATe  ON | OFF;
CALCulate:DLINe<1|2> <numeric_value>
```

REFERENCE LINE

```
CALCulate:RLINe:STATe ON | OFF;
CALCulate:RLINe <numeric_value>
```

THRESHOLD LINE

```
CALCulate:THReshold ON | OFF;
CALCulate:THReshold <numeric_value>
```

TIME LINE 1/2

```
CALCulate:TLINe<1|2>:STATe ON | OFF;
CALCulate:TLINe<1|2> <numeric_value>
```

LIMITS

SELECT LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:NAME <string>;
CALCulate<1|2>:LIMit<1...8>:STATe ON | OFF
```

COPY LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:COPY 1...8 | <name>
```

DELETE LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:DELete
```

X OFFSET

```
CALCulate<1|2>:LIMit<1...8>:CONTrol:OFFset <numeric_value>
```

Y OFFSET

```
CALCulate<1|2>:LIMit<1...8>:UPPer:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:LOWer:OFFset <numeric_value>
```

EDIT LIMIT LINE

```
CALCulate<1|2>:LIMit<1...8>:UNIT  DBM| DBPW| WATT| DBUV | DBMV | VOLT |
                                  DBUA | AMPere| DB|
                                  DBUV_MHZ| DBMV_MHZ | DBUA_MHZ|
                                  DEG| RAD| S| HZ| PCT
CALCulate<1|2>:LIMit<1...8>:CONTrol[:DATA] <num_value>,<num_value>..
CALCulate<1|2>:LIMit<1...8>:CONTrol:DOMain   FREQuency|TIME
CALCulate<1|2>:LIMit<1...8>:CONTrol:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:CONTrol:MODE   RELative | ABSolute
CALCulate<1|2>:LIMit<1...8>:CONTrol:UNIT[:TIME] S | SYM
CALCulate<1|2>:LIMit<1...8>:UPPer[:DATA] <num_value>,<num_value>..
CALCulate<1|2>:LIMit<1...8>:UPPer:STATe   ON | OFF
CALCulate<1|2>:LIMit<1...8>:UPPer:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:UPPer:MARGin <numeric_value>
CALCulate<1|2>:LIMit<1...8>:UPPer:MODE   RELative | ABSolute
CALCulate<1|2>:LIMit<1...8>:LOWer[:DATA] <num_value>,<num_value>..
CALCulate<1|2>:LIMit<1...8>:LOWer:STATe ON | OFF
CALCulate<1|2>:LIMit<1...8>:LOWer:OFFset <numeric_value>
CALCulate<1|2>:LIMit<1...8>:LOWer:MARGin <numeric_value>
CALCulate<1|2>:LIMit<1...8>:LOWer:MODE   RELative | ABSolute
```

NEW LIMIT LINE	s. EDIT LIMIT LINE
NAME	CALCulate<1|2>:LIMit<1...8>:NAME <string>
VALUES	no corresponding IEC/IEEE-bus command
DELETE VALUE	no corresponding IEC/IEEE-bus command
INSERT VALUE	no corresponding IEC/IEEE-bus command
SAVE LIMIT LINE	automatically executed during IEC/IEEE-bus operation
SHIFT X LIMIT LINE	CALCulate<1|2>:LIMit<1...8>:CONTrol:SHIFt <numeric_value>
SHIFT Y LIMIT LINE	CALCulate<1|2>:LIMit<1...8>:UPPer:SHIFt <numeric_value> CALCulate<1|2>:LIMit<1...8>:LOWer:SHIFt <numeric_value>

3.9.3.8 TRACE Key Group

TRACE	--
BLANK	DISPlay[:WINDow<1|2>]:TRACe<1...4>[:STATe] OFF
CLEAR/WRITE	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE WRITe
CONTINUOUS WRITE	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE:CWRite ON|OFF
VIEW	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE VIEW
AVERAGE	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE AVERage
MAX HOLD	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE MAXHold
MIN HOLD	DISPlay[:WINDow<1|2>]:TRACe<1...4>:MODE MINHold
SWEEP COUNT	[SENSe:]SWEep:COUNt <numeric_value>

3.9.3.9 SWEEP Key Group

COUPLING	--
ANALOG BW AUTO	[SENSe:]BANDwidth|BWIDth[:RESolution]:AUTO ON | OFF
ANALOG BW MANUAL	[SENSe:]BANDwidth|BWIDth[:RESolution] <numeric_value>
MAIN PLL BANDWIDTH	[SENSe:]BANDwidth|BWIDth:PLL AUTO|HIGH|MEDium|LOW
SWEEP	
CONTINUOUS SWEEP	INITiate:CONTinuous ON
RESULT LENGTH	[SENSe:]DDEMod:TIME <numeric_value>
SINGLE SWEEP	INITiate:CONTinuous OFF
SWEEP COUNT	[SENSe:]SWEep:COUNt <numeric_value>

3.9.3.10 SWEEP Key Group - Digital Demodulation

TRIGGER	
FREE RUN	TRIGger[:SEQuence]:SOURce IMMediate
SLOPE POS/NEG	TRIGger[:SEQuence]:SLOPe POSitive|NEGative
VIDEO	TRIGger[:SEQuence]:SOURce VIDeo TRIGger[:SEQuence]:LEVel:VIDeo <numeric value>
FIND BURST	[SENSe:]DDEMod:SEARch:PULSe:STATe ON | OFF
FIND SYNC ON/OFF	[SENSe:]DDEMod:SEARch:SYNC:STATe ON | OFF
SYNC OFFSET	[SENSe:]DDEMod:SEARch:SYNC:OFFSET <numeric_value>

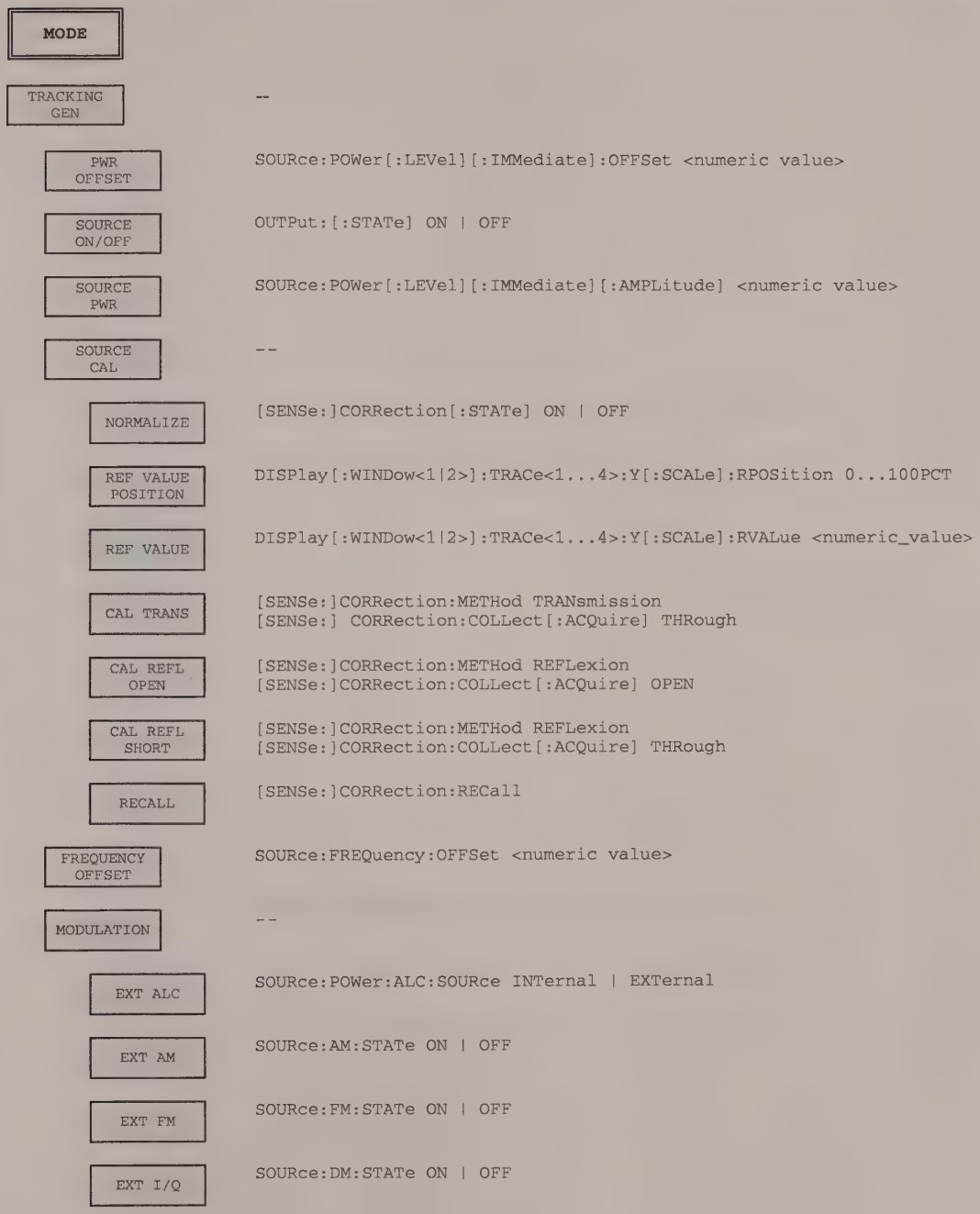
SYNC PATTERN	--
DELETE PATTERN	--
SELECT PATTERN	--
SYNC PATTERN	--
COMMENT	--
NAME	--
NEW SYNC PATTERN	[SENSe:]DDEMod:SEARch:SYNC:PATTern <string>
SAVE PATTERN	automatically executed during IEC/IEEE-bus operation
VALUE	[SENSe:]DDEMod:SEARch:SYNC:PATTern <string>
EDIT SYNC PATTERN	[SENSe:]DDEMod:SEARch:SYNC:PATTern <string>

3.9.3.11 SWEEP Key Group - Analog Demodulation

TRIGGER	
FREE RUN	TRIGger[:SEQuence]:SOURce IMMediate
VIDEO	TRIGger[:SEQuence]:SOURce VIDeo TRIGger[:SEQuence]:LEVel:VIDeo <numeric value>
EXTERN	TRIGger[:SEQuence]:SOURce EXTernal TRIGger[:SEQuence]:LEVel[:EXTernal] <numeric value>
AF SIGNAL	TRIGger[:SEQuence]:SOURce AF
SLOPE POS/NEG	TRIGger[:SEQuence]:SLOPe POSitive|NEGative
TRIGGER OFFSET	TRIGger[:SEQuence]:HOLDoff <numeric_value>

3.9.4 Tracking Generator Mode (Option FSE-B8...B11)

3.9.4.1 CONFIGURATION Key Group



3.9.5 TV-Demodulation Mode (Option FSE-B3)

3.9.5.1 CONFIGURATION Key Group

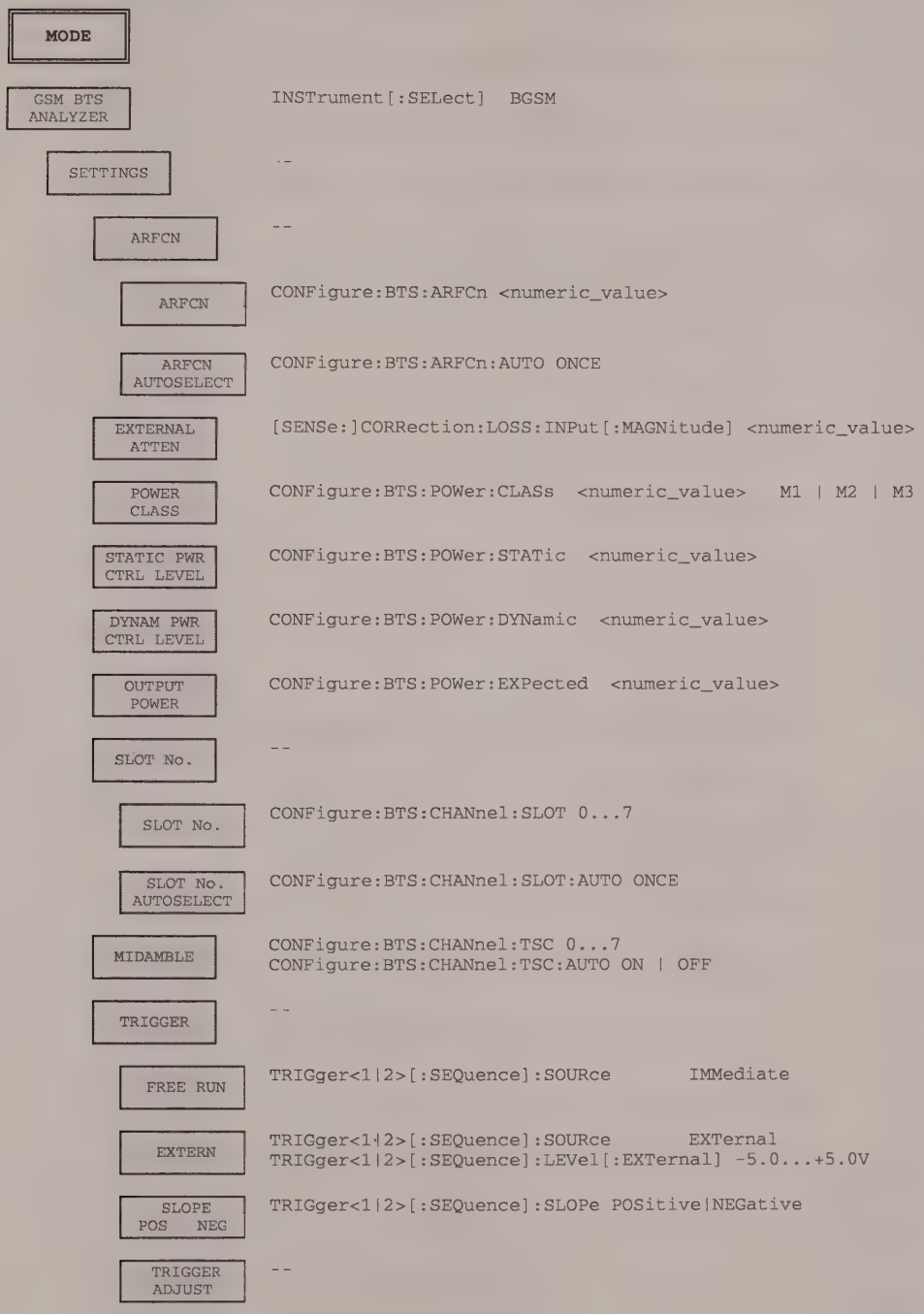
MODE	
TV DEMOD	[SENSe:]TV[:STATe] ON | OFF
525 LINE SYSTEM	TRIGger[:SEQuence]:VIDeo:FORMat:LPFRame 525
625 LINE SYSTEM	TRIGger[:SEQuence]:VIDeo:FORMat:LPFRame 625
PICT/SOUND OFFSET	[SENSe:]TV:PSOFfset <numeric_value>
TV DEMOD OFF	[SENSe:]TV[:STATe] ON | OFF
VIDEO POL NEGATIVE	TRIGger[:SEQuence]:VIDeo:SSIGnal:POLarity NEGative
VIDEO POL POSITIVE	TRIGger[:SEQuence]:VIDeo:SSIGnal:POLarity POSitive

3.9.5.2 SWEEP Key Group

TRIGGER	
TV	TRIGger[:SEQuence]:SOURce TV
TV TRIGGER SETTINGS	--
VERT SYNC	TRIGger[:SEQuence]:VIDeo:FIELd:SELect ALL
HOR SYNC	TRIGger[:SEQuence]:VIDeo:LINE:NUMBer <numeric_value>
VERT SYNC EVEN FIELD	TRIGger[:SEQuence]:VIDeo:FIELd:SELect EVEN
VERT SYNC ODD FIELD	TRIGger[:SEQuence]:VIDeo:FIELd:SELect ODD

3.9.6 GSM BTS Analysis Mode (Option FSE-K11)

3.9.6.1 CONFIGURATION Key Group



FRAME COARSE	TRIGger[:SEQuence]:SYNChronize:ADJust:FRAMe <numeric_value>
FRAME FINE	TRIGger[:SEQuence]:SYNChronize:ADJust:FRAMe <numeric_value>
AUTO FRAME ADJUST	TRIGger[:SEQuence]:SYNChronize:ADJust:FRAMe:AUTO ONCE
SLOT ADJUST	TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT <numeric_value>
AUTO SLOT ADJUST	TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT:AUTO ONCE
DEFAULT SETTINGS	CONFigure:BTS:PRESet
P-GSM 900	CONFigure:BTS:NETWork[:TYPE] PGSM
E-GSM 900	CONFigure:BTS:NETWork[:TYPE] EGSM
DCS 1800	CONFigure:BTS:NETWork[:TYPE] DCS
PCS 1900	CONFigure:BTS:NETWork[:TYPE] PCS
PHASE II I	CONFigure:BTS:NETWork:PHASe 1|2
LIMIT MARGIN	CALCulate<1|2>:LIMit<1...8>:MARGin <numeric_value>
SPURIOUS	CONFigure:SPURious[:IMMediate] CALCulate:LIMit:SPURious? TXBand | OTXBand | RXBand CALCulate:LIMit:SPURious:FAILs? TXBand | OTXBand | RXBand
START LIST	READ:SPUR[:ALL]?
START LIST SGL STEP	ABORT;READ:SPUR:STEP?
CONT SGL STEP LIST	READ:SPUR:STEP?
TX SUPPR ON OFF	CONFigure:BTS:TXSupp ON | OFF
RX BAND GAIN	[SENSe:]CORRection:RXGain:INPut[:MAGNitude] <numeric_value>
SWEEP COUNT	CONFigure:SPURious:COUNt <numeric_value>
SWP COUNT TX / <> TX	CONFigure:SPURious:RANGe TXBand | OTXBand
SWP COUNT RX BAND	CONFigure:SPURious:RANGe RXBand
SET TO STANDARD	--

TX BAND	CONFigure:SPURious:RANGe TXBand
<> TX BAND	CONFigure:SPURious:RANGe OTXBand
RX BAND	CONFigure:SPURious:RANGe RXBand
BTS SFH ON OFF	CONFigure:BTS:CHANnel:SFH ON | OFF
COSITING	CONFigure:BTS:COSiting ON | OFF
TRANSIENT SPECTRUM	CONFigure:SPECtrum:SWITching[:IMMediate] CALCulate:LIMit:SPECtrum:SWITching? ARFCn|TXBand|RXBand|COMBined CALCulate:LIMit:SPECtrum:SWITching:FAILs? ARFCn|TXBand|RXBand|COMBined
SINGLE FREQ SWEEP	INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS FREQ SWEEP	INITiate:CONTinuous ON; INITiate [:IMMediate]
START LIST	READ:SPECtrum:SWITching[:ALL]?
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	--
BTS SFH ON OFF	CONFigure:BTS:CHANnel:SFH ON | OFF
MODULATION SPECTRUM	CONFigure:SPECtrum:MODulation[:IMMediate] CALCulate:LIMit:SPECtrum:MODulation? ARFCn|TXBand|RXBand|COMBined CALCulate:LIMit:SPECtrum:MODulation:FAILs? ARFCn|TXBand|RXBand|COMBined CALCulate:LIMit:SPECtrum:MODulation:EXCeptions? ARFCn|TXBand|RXBand|COMBined
SINGLE FREQ SWEEP	INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS FREQ SWEEP	INITiate:CONTinuous ON; INITiate [:IMMediate]
START LIST	READ:SPECtrum:MODulation[:ALL]?
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	--
ARFCN ±1.■ MHZ	CONFigure:SPECtrum:MODulation:RANGe ARFCn

TX BAND	CONFigure:SPECtrum:MODulation:RANGe TXBand
±1.8 MHZ / TX BAND	CONFigure:SPECtrum:MODulation:RANGe COMBined
RX BAND	CONFigure:SPECtrum:MODulation:RANGe RXBand
RX BAND GAIN	[SENSe:]CORRection:RXGain:INPut[:MAGNitude] <numeric_value>
TRIGGER ADJUST	see SETTINGS submenu
POWER VS TIME	CONFigure: BURSt:PTEMplate[:IMMediate] CALCulate:LIMit:BURSt:PTEMplate?
SINGLE	INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS	INITiate:CONTinuous ON; INITiate [:IMMediate]
FULL BURST	CONFigure: BURSt:PTEMplate:SELect FULL
BURST HIGH RESOLUTION	CONFigure: BURSt:PTEMplate:SELect TOP
RISING	CONFigure: BURSt:PTEMplate:SELect RISing
FALLING	CONFigure: BURSt:PTEMplate:SELect FALLing
MEAS BANDWIDTH	[SENSe:]BANDwidth|BWIDth[:RESolution] DEF | 300 kHz | 1 MHz
SYNC TO MIDAMBLE	TRIGger[:SEQuence]:SYNChronize:SOURce FRAMe | TSC
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	--
TRIGGER ADJUST	see SETTINGS submenu
CARRIER POWER	CONFigure: BURSt:POWer[:IMMediate] CALCulate:LIMit:BURSt:POWer?
MEAS MAX OUTPUT PWR	READ:BURSt:POWer?
INC STATIC PWR CTRL	READ:BURSt:POWer:STATic?

INC DYNAM PWR CTRL	READ:BURSt:POWer:DYNamic?
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	-
CONDITIONS NORM EXTR	CONFigure: BURSt:POWer:CONDition NORMal | EXTReme
SYNC TO MIDAMBLE	TRIGger[:SEQuence]:SYNChronize:SOURce FRAMe | TSC
TRIGGER ADJUST	see SETTINGS submenu
PHASE/FREQ ERROR	CONFigure: BURSt:PFERror[:IMMediate]
SINGLE	INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS	INITiate:CONTinuous ON; INITiate [:IMMediate]
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	--

3.9.7 GSM MS Analysis Mode (Option FSE-K10)

3.9.7.1 CONFIGURATION Key Group

MODE	
GSM MS ANALYZER	INSTrument[:SELect] MGSM
SETTINGS	--
ARFCN	CONFigure:MS:ARFCn <numeric_value>
ARFCN AUTOSELECT	CONFigure:MS:ARFCn:AUTO ONCE
EXTERNAL ATTEN	[SENSe:]CORRection:LOSS:INPut[:MAGNitude] <numeric_value>
POWER CLASS	CONFigure:MS:POWer:CLASs <numeric_value>
PWR CTRL LEVEL	CONFigure:MS:POWer:LEVel <numeric_value>
DEFAULT SETTINGS	CONFigure:MS:PRESet
OUTPUT POWER	CONFigure:MS:POWer:EXPected <numeric_value>
MIDAMBLE	CONFigure:MS:CHANnel:TSC 0...7
P-GSM 900	CONFigure:MS:NETWork[:TYPE] PGSM
E-GSM 900	CONFigure:MS:NETWork[:TYPE] EGSM
DCS 1800	CONFigure:MS:NETWork[:TYPE] DCS
PCS 1900	CONFigure:MS:NETWork[:TYPE] PCS
PHASE II I	CONFigure:MS:NETWork:PHASe 1|2
LIMIT MARGIN	CALCulate<1|2>:LIMit<1...8>:MARGin <numeric_value>

TRIGGER -

FREE RUN TRIGger<1|2>[:SEQuence]:SOURce IMMediate

VIDEO TRIGger<1|2>[:SEQuence]:SOURce VIDeo

EXTERN TRIGger<1|2>[:SEQuence]:SOURce EXTernal
TRIGger<1|2>[:SEQuence]:LEVel[:EXTernal] -5.0...+5.0V

RF POWER TRIGger<1|2>[:SEQuence]:SOURce RFPower

SLOPE POS NEG TRIGger<1|2>[:SEQuence]:SLOPe POSitive|NEGative

TRIGGER ADJUST --

COURSE ADJUST TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT <numeric_value>

FINE ADJUST TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT <numeric_value>

AUTO ADJUST TRIGger[:SEQuence]:SYNChronize:ADJust:SLOT:AUTO ONCE

SPURIOUS CONFigure:SPURious[:IMMediate]
CALCulate:LIMit:SPURious? TXBand | OTXBand | IDLeband
CALCulate:LIMit:SPURious:FAILs? TXBand | OTXBand | IDLeband

START LIST READ:SPUR[:ALL]?

START LIST SGL STEP ABORT;READ:SPUR:STEP?

CONT SGL STEP LIST READ:SPUR:STEP?

TX SUPPR ON OFF CONFigure:MS:TXSupp ON | OFF

SWEEP COUNT CONFigure:SPURious:COUNt <numeric_value>

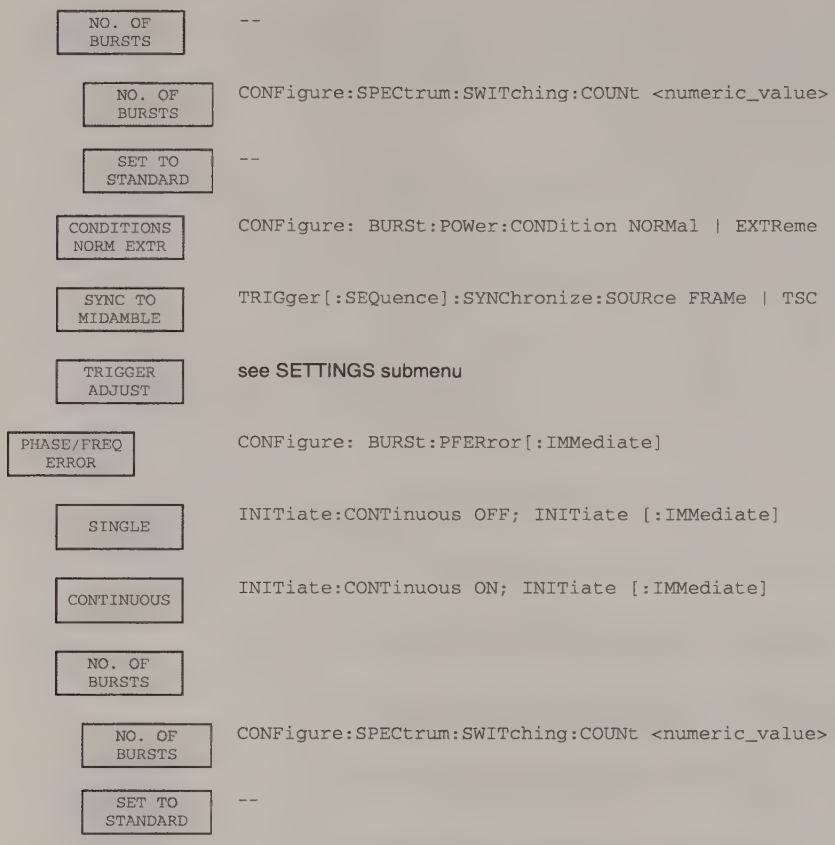
TX BAND CONFigure:SPURious:RANGe TXBand

<> TX BAND CONFigure:SPURious:RANGe OTXBand

IDLE MODE CONFigure:SPURious:RANGe IDLeband

TRANSIENT SPECTRUM	CONFigure:SPECtrum:SWITching[:IMMediate] CALCulate:LIMit:SPECtrum:SWITching? ARFCn|TXBand|RXBand|COMBined CALCulate:LIMit:SPECtrum:SWITching:FAILs? ARFCn|TXBand|RXBand|COMBined
SINGLE FREQ SWEEP	INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS FREQ SWEEP	INITiate:CONTinuous ON; INITiate [:IMMediate]
START LIST	READ:SPECtrum:SWITching[:ALL]?
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	-
TRIGGER ADJUST	see SETTINGS submenu
MODULATION SPECTRUM	CONFigure:SPECtrum:MODulation[:IMMediate] CALCulate:LIMit:SPECtrum:MODulation? ARFCn|TXBand|RXBand|COMBined|DCSRx1800 CALCulate:LIMit:SPECtrum:MODulation:FAILs? ARFCn|TXBand|RXBand|COMBined DCSRx1800 CALCulate:LIMit:SPECtrum:MODulation:EXCeptions? ARFCn|TXBand|RXBand|COMBined|DCSRx1800
SINGLE FREQ SWEEP	INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS FREQ SWEEP	INITiate:CONTinuous ON; INITiate [:IMMediate]
START LIST	READ:SPECtrum:MODulation[:ALL]?
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	--
ARFCN ± 1.8 MHz	CONFigure:SPECtrum:MODulation:RANGe ARFCn
TX BAND	CONFigure:SPECtrum:MODulation:RANGe TXBand
±1.8 MHZ TX BAND	CONFigure:SPECtrum:MODulation:RANGe COMBined

RX BAND GSM 900	CONFigure:SPECtrum:MODulation:RANGe RXBand
RX BAND DCS 1800	CONFigure:SPECtrum:MODulation:RANGe DCSRx1800
TRIGGER ADJUST	see SETTINGS submenu
RX BAND GAIN	[SENSe:]CORRection:RXGain:INPut[:MAGNitude] <numeric_value>
POWER VS TIME	CONFigure: BURSt:PTEMplate[:IMMediate] CALCulate:LIMit:BURSt:PTEMplate?
SINGLE	INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS	INITiate:CONTinuous ON; INITiate [:IMMediate]
FULL BURST	CONFigure: BURSt:PTEMplate:SELect FULL
BURST HIGH RESOLUTION	CONFigure: BURSt:PTEMplate:SELect TOP
RISING	CONFigure: BURSt:PTEMplate:SELect RISing
FALLING	CONFigure: BURSt:PTEMplate:SELect FALLing
MEAS BANDWIDTH	[SENSe:]BANDwidth|BWIDth[:RESolution] DEF | 300 kHz | 1 MHz
SYNC TO MIDAMBLE	TRIGger[:SEQuence]:SYNChronize:SOURce FRAMe | TSC
NO. OF BURSTS	--
NO. OF BURSTS	CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD	--
TRIGGER ADJUST	see SETTINGS submenu
CARRIER POWER	CONFigure: BURSt:POWer[:IMMediate] CALCulate:LIMit:BURSt:POWer?
MEAS MAX OUTPUT PWR	READ:BURSt:POWer?
INC PWR CTRL LEVEL	READ:BURSt:POWer:LEVel?


NO. OF BURSTS
--
NO. OF BURSTS
CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD
--
CONDITIONS NORM EXTR
CONFigure: BURSt:POWer:CONDition NORMal | EXTReme
SYNC TO MIDAMBLE
TRIGger[:SEQuence]:SYNChronize:SOURce FRAMe | TSC
TRIGGER ADJUST
see SETTINGS submenu
PHASE/FREQ ERROR
CONFigure: BURSt:PFERror[:IMMediate]
SINGLE
INITiate:CONTinuous OFF; INITiate [:IMMediate]
CONTINUOUS
INITiate:CONTinuous ON; INITiate [:IMMediate]
NO. OF BURSTS
NO. OF BURSTS
CONFigure:SPECtrum:SWITching:COUNt <numeric_value>
SET TO STANDARD
--

Annex C – Alphabetical List of Commands

Command	Parameter	Page
ABORt		3.6-7
CALCulate<1|2>:DELTamarker<1 to 4>:AOFF		3.6-9
CALCulate<1|2>:DELT<1 to 4>:FUNCtion:FIXed:RPOint:X	<numeric_value>	3.6-12
CALCulate<1|2>:DELT<1 to 4>:FUNCtion:FIXed:RPOint:Y		3.6-12
CALCulate<1|2>:DELT<1 to 4>:FUNCtion:FIXed:RPOint:Y:OFFSet	<numeric_value>	3.6-12
CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:FIXed[:STATe]	ON | OFF	3.6-12
CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:PNOise:RESult?		3.6-13
CALCulate<1|2>:DELTamarker<1 to 4>:FUNCtion:PNOise[:STATe]	ON | OFF	3.6-13
CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:APEak		3.6-10
CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:LEFT		3.6-11
CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:NEXT		3.6-10
CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum[:PEAK]		3.6-10
CALCulate<1|2>:DELTamarker<1 to 4>:MAXimum:RIGHt		3.6-10
CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:LEFT		3.6-11
CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:NEXT		3.6-11
CALCulate<1|2>:DELTamarker<1 to 4>:MINimum[:PEAK]		3.6-11
CALCulate<1|2>:DELTamarker<1 to 4>:MINimum:RIGHt		3.6-11
CALCulate<1|2>:DELTamarker<1 to 4>:MODE	ABSolute | RELative	3.6-9
CALCulate<1|2>:DELTamarker<1 to 4>:STEP:AUTO	ON | OFF	3.6-13
CALCulate<1|2>:DELTamarker<1 to 4>:STEP[:INCRement)]	<numeric value>	3.6-13
CALCulate<1|2>:DELTamarker<1 to 4>:TRACe	1 to 4	3.6-9
CALCulate<1|2>:DELTamarker<1 to 4>:X	0 to MAX (frequency | sweep time | symbols)	3.6-9
CALCulate<1|2>:DELTamarker<1 to 4>:X:RELative?		3.6-9
CALCulate<1|2>:DELTamarker<1 to 4>:Y?		3.6-10
CALCulate<1|2>:DELTamarker<1 to 4>[:STATe]	ON | OFF	3.6-8
CALCulate<1|2>:DLINe<1|2>	MIN to MAX (depending on current unit)	3.6-14
CALCulate<1|2>:DLINe<1|2>:STATe	ON | OFF	3.6-14
CALCulate<1|2>:FEED	'XTIM:DDEM:MEAS' | 'XTIM:DDEM:REF' | 'XTIM:DDEM:ERR:MPH' | 'XTIM:DDEM:ERR:VECT' | 'XTIM:DDEM:SYMB' | 'XTIM:AM' |'XTIM:FM' |'XTIM:PM' |'XTIM:AMSummary' |'XTIM:FMSummary' | 'XTIM:PMSummary' |'TCAP'	3.6-17
CALCulate<1|2>:FLINe<1|2>	0 GHz to f_{max}	3.6-15
CALCulate<1|2>:FLINe<1|2>:STATe	ON | OFF	3.6-15
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